

# Railway Age Gazette

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Never before have scrap materials of all kinds commanded such high prices, and it is doubtful also if the railways have ever before been so much in need

### The Spring House Cleaning

of additional revenue. The incentives for a thorough spring house cleaning on our railroads are therefore exceptionally great. The early spring season, before the grass and weeds have gotten well started, is a most opportune time for picking up scrap, and particularly small scrap that may be found alongside the right-of-way or in the vicinity of engine houses and repair plants. With the present prices it will be found advantageous to pick up and utilize even the smallest pieces of metal, including washers, small bolts and nuts. Another field which offers attractive possibilities is that of waste paper. Often records which are of no use and which it is not necessary to keep beyond a certain period accumulate and are filed in out of the way places and forgotten. At an average size division point on a large railroad four tons of such waste paper were recently gathered together in a clean-up, netting the company \$27 a ton, or a total of \$108. Doubtless there are hundreds of division headquarters throughout the country that might make as good or even a better showing. With the prices that are now being paid for waste paper it is profitable to install baling machines at the more important points and have the agents collect and forward all waste paper to these points at regular intervals. A thorough spring house cleaning and clean-up could advantageously be made on all of our railways at this time.

New Jersey has modified her full crew law and in Pennsylvania the railroads have renewed their appeal to the legislature.

### Excess Crew Laws

A number of newspapers, citing the present crisis as a conclusive reason, have voiced the demand for the repeal of the full crew laws in New York and other states. The excess crew laws were never justified. Still less can they be justified now that the United States is beginning to call upon its man power to do its share in opposing Kaiserism and autocracy. Most of the comments emphasize the feature of

economy and confine themselves largely to the point that a mighty nation in these days wages war with every resource at its command. "And economy in war time," says one paper, "through all its manifestations, means chiefly the conservation and wise direction of human effort." This argument is absolutely true, and an additional factor that must not be overlooked is the recognized patriotic zeal of railroad men. We have heard from time to time about the wage increases, the war bonuses, the threatened strikes of railway men in England and in the other countries with which we are preparing to stand shoulder to shoulder in the present conflict. But, we have also heard that when the call for men for Kitchener's army came, it was the railway men that outdid themselves in rushing to the colors. Indeed, so zealous were they to help their country that they enlisted to the extent of 10, 14, 16 or even 18 per cent of their company's male forces of military age, until, in desperation, the English railways had to demand that a railway worker who would enlist should secure his superior's consent. They even had to call men back from France so that the operation of England's railways could go on. One of the best kinds of preparedness will be efficient and economical railway operation. The mechanical and maintenance of way departments of American railways are already seriously handicapped by the lack of men. The trainmen should co-operate therefore in helping to secure the repeal of a law which will release men for more important and necessary service.

The present high prices of all commodities make it imperative for the railroads to take every precaution to avoid claims

### Watch the Loss and Damage Claims

for loss and damage to freight. While it is particularly desirable to reduce the expense from this source, unfortunately the conditions prevailing at the present time have a tendency to increase the damage to lading. A great many shippers are working under pressure to secure maximum output and the quickest possible shipment. The extraordinary rush of business is apt to result in careless packing and loading; therefore, freight agents should inspect shipments with great care. Similar conditions must be guarded against at freight houses,

as in trying to load cars of package freight to their capacity, freight men often are tempted to resort to loading methods which result in damage to the lading. The scarcity of cars is also a factor, as there is a tendency to use cars for classes of freight for which they are not suited, taking a chance on the load reaching its destination in good order. Judging from present indications, the high prices of materials and the wage increases which the roads have been forced to grant will make it necessary for them to stop losses wherever possible in order to show a fair margin of profit for the present year's operations. Loss and damage claims amount to but a small percentage of gross revenue, but when we compare their amount with the net operating income it becomes apparent that any considerable increase in the amount chargeable to loss and damage will make a serious reduction in the profits of operation. The railroads get no more for hauling a bushel of wheat or potatoes worth \$2 than they did when the same products sold for 60 cents a bushel, but with the high prices now prevailing a very small damage loss will wipe out the railroad's profit in handling the freight.

In the hands of a competent administrative body and in the absence of local political influences of importance, the work on the government railway in

**Eight Hours on Alaska, like that on the Panama Canal, seems to be proceeding with commendable efficiency. However, the disadvantages of government control are apparent even in this case. For example, the eight-hour day is enforced as to all men employed on an hourly basis. This is not a basic eight-hour day, but the actual eight-hour day of the statute covering government work. The feelings of the commission in charge of this work are indicated by the following quotation from its report: "The hourly rate used did not have as much weight with the individual workers as the total amount earned for the day, as most men in Alaska had been accustomed to work 10 hours per day. It is probable there would have been little difficulty in getting men for a considerably less rate per hour if they had worked on a 10-hour schedule, thereby earning more per day." The tendency of railway regulation is to place serious obstacles in the way of efficient conduct of private ventures, but fortunately this has not yet been carried to the extreme of absolutely limiting the hours that employees may work, even when they would prefer to work longer hours.**

Under the stress of war time conditions it is often possible to accomplish results that apparently cannot be attained at other

**A Warning to Trespassers** times. It is possible that one desirable result of the entrance of the United States into the war may be a considerable reduction in the number of trespassing accidents on railways, which

now accounts for more than half of the total railway casualties each year. Fairfax Harrison, president of the Southern and general chairman of the American Railway Association's Special Committee on National Defense, has issued a statement calling attention to the importance of all loyal citizens keeping off railway premises unless they have business thereon and pointing out that "trespassing on railway property, at all times a perilous practice, involves an even greater hazard for the trespasser now that it has become necessary to place armed guards at strategic points to prevent possible interference with the country's transportation facilities through the depredations of enemy agents." "In addition to the ever-present danger of being killed by a train," Mr. Harrison says, "the man who now trespasses on railway property subjects himself to the peril of being shot, should he fail to heed the challenge of the military guard. Charged with the duty of protecting railway structures whose destruc-

tion would interfere seriously with transportation, the guards cannot afford to take any chances. Unfortunate occurrences can be avoided if citizens who have no business on railway property will keep off. It is especially important that pedestrians who have been accustomed to walking tracks, rather than the public highways, should understand the added danger and recognize that they can perform a patriotic service by avoiding it." During the fiscal year 1916 4,847 persons were killed while trespassing on railway property, or 54 per cent of the total railway casualties, which numbered 8,878, and ever since the Interstate Commerce Commission has kept accident statistics the number of trespassers has outnumbered all other persons killed on railways. The railways have made every effort to prevent the practice of trespassing and have attempted to secure the passage and enforcement of adequate laws to eliminate this source of accident, but it has been generally impossible to arouse the interest of public authorities beyond the accidents which may be attributed to the faults of the railways themselves. It is likely that the presence of armed guards will have a moral effect in keeping people off of railway tracks who do not belong there, which will make up to some extent for the shortcomings of the constituted authorities.

#### ADVERTISING THE WAR LOAN

**I**N an article on another page our European correspondent tells something of the methods that are being followed in England, France and other warring countries to secure subscriptions to great war loans by people who can only invest in small amounts. His article deals also with railway securities. He shows how both the European governments and the European railways, particularly those in France, have secured remarkably good results with bonds of small denominations and by means of advertising. The article has some important lessons for America. The United States is on the point of raising \$7,000,000,000 to help pay for its participation in the war, \$5,000,000,000 of this truly fabulous total being raised by the sale of bonds. There are many people in this nation who will want to subscribe to this loan but who will be unable so to do unless the bonds are in small denominations. The United States will want to get these small subscriptions, and it is hoped that steps will be taken whereby they can be obtained, as has been so successfully done abroad. The railways will want to do their share, but they also will have to raise money from time to time, and in competition under present conditions they will have to leave no stone unturned. Perhaps they too, when they consider the difficulties of securing funds on the one hand, and the advantages in the way of good will of securing the co-operation of the small investors on the other, will find it advisable to issue stock and bonds in small denominations.

The popularity of the bonds of small denominations will depend largely on the extent and way in which they are advertised. There are railroads in this country that have been very chary in the past about putting signs on their station walls or in their city ticket offices. But it is a poor rule that cannot be broken in a worthy cause. There is reason for gratification, therefore, that many of these railways have already granted permission to the army and navy for the posting of recruiting posters at stations and ticket offices. The railways, as a matter of fact, have always done considerable of Uncle Sam's advertising. They have advertised his national parks, his land sales, his newly opened farming areas, etc., and with very good results. Uncle Sam, apparently, judging by the way he has called upon the advertising leaders of the nation, is going to do some of his own advertising in the present crisis. The railways should continue to allow the posting of recruiting signs and those who have not yet done so should get in line.

When the proper time comes, let them also post the details of the new war loan at the stations and city ticket offices. The United States has the keenest advertising men and the most enterprising railroads in the world. Here is a chance for them to get together and produce some really great results.

## ENGINEERING IN THE MECHANICAL DEPARTMENT

**L**AST year the mechanical department officers of the railroads in the United States and Canada were responsible for the purchase of about \$300,000,000 worth of cars and locomotives. The design of much of this equipment was left largely to the builders and a very small part of it was given anything even approaching the careful consideration which would be given to like expenditures in any other industry. This condition indicates an inexcusable lack of forethought on the part of railway managements, coupled with a false conception of the function of the equipment builders.

There is no reason why an outline of the equipment requirements of any railroad can not be determined upon one or even two years in advance of its purchase. With this information in his hands, the mechanical engineer is placed in a position to prepare designs which can be studied and revised until in their final form they are free from many defects which otherwise would have been a source of continued and unnecessary expense, either in the cost of operation or maintenance, throughout the life of the equipment. Too frequently, however, it is not until an appropriation has been made for the purchase of equipment that any serious attention is given to its design, and then the foremost thought of the management is to see the equipment in service. The mechanical engineer may be given from two or three days to a week in which to select a basic design and prepare specifications. The builders are confronted with this information and asked, "When can you deliver the equipment?" Under such conditions what can be expected that is worthy of the name of designing?

There is an impression among many railroad men that the equipment builders, because of their wide experience in building thousands of cars and locomotives of various types, are better fitted to design equipment than the railroads themselves. While in no way disparaging the engineering ability which may be brought by the builders to the task of designing new equipment, they are entirely out of touch with the many local requirements and peculiarities of operating conditions, a knowledge of which is of primary importance, if the equipment is to perform the best service for the money expended. Furthermore the builders are securing the greater part of their business on a competitive basis and are necessarily more concerned in meeting the desires of their clients as to delivery than in refining the design. The function of the builders is to build equipment and if careful designing is to be done, it should be done by the railroads.

Few railroad officers consider that the expenditure required to build up and maintain an adequate drafting room force is a legitimate charge to be included in the cost of the equipment purchased. Those who look upon the cost of an adequate mechanical engineering department as unjustified, utterly fail to appreciate the large return which this expenditure will make possible. On one railroad which designs its own equipment, the weight of a coal car was reduced by about four tons after several successive redesigns. That the original car was well designed is sufficiently vouched for by the fact that the ratio of revenue load to total load, based on 10 per cent overload, was 75 per cent. Assuming a saving in the cost of the car at the rate of three cents per pound of weight reduction, the first cost of each car was reduced \$240. On an order for 1,000 cars this repre-

sents an aggregate saving of \$240,000. If the average life of these cars is assumed to be 20 years and the salvage value 10 per cent of the original cost, with interest at five per cent, the annual reduction of interest and depreciation charges on the 1,000 cars approximates \$18,500 throughout their life.

These cars are in coal carrying service and make a yearly average of about 50 miles a day. On this basis the weight saved represents an annual saving of 72,000,000 ton-miles per year for the 1,000 cars. Considering a conservative figure of one and one-half mills as the added cost of operation per ton-mile, of added dead weight, there is an annual saving in the cost of operating 1,000 cars of the lighter weight, as compared with those of the original design, of \$108,000. Adding to this the saving in interest and depreciation charges, the total annual saving amounts to over \$126,000. At the end of 20 years there has been a total saving of about \$2,500,000, not including interest on the reduction in cost of operation—an amount considerably in excess of the original cost of the equipment.

This may be considered an exceptional case. The same return based on the weight which might be saved probably seldom could be realized from a similar expenditure of effort in the drawing room. However, the cost of making the several successive designs probably did not exceed \$4,000 and it is evident that with far less spectacular results, few investments can be made which will bring greater returns than a liberal expenditure for car design—an expenditure which in the case cited probably did not exceed two one-hundredths of one per cent, and seldom could exceed one per cent of the value of the equipment purchased, unless the order were very small.

## CLOSE UP THE RAILWAY RANKS

**T**HE successful conduct of war under modern conditions demands the mobilization, not merely of armies and navies, but of all the resources, industrial as well as military, of a nation. Of these industrial resources of a nation none is more important than its railways. President Wilson has issued an appeal to all the people of the country to exert themselves to the utmost in their respective spheres to raise to the practicable maximum during the war the economy and efficiency of productive operations. He addresses part of his appeal specifically to those connected with the railways. This part of his message is as follows:

"To the men who run the railways of the country, whether they be managers or operative employees, let me say that the railways are the arteries of the nation's life, and that upon them rests the immense responsibility of seeing to it that those arteries suffer no obstruction of any kind, no inefficiency or slackened power."

The President's appeal, so far as it touches on the railways, is directed to both their managers and their employees. Differences always have arisen between the managers and employees. They always will arise. But in time of war they arise in circumstances entirely different from those which surround them in time of peace. Even when the nation is at peace its welfare is favorably or unfavorably affected, according as the relations between the railways and their employees are good or bad. In time of war not only the general welfare, but the very existence of the nation, might be imperiled by unsatisfactory relations between them.

We are not referring here merely to the possibility that such relations might lead to strikes which would seriously interfere with transportation service. No government fit to exist would in time of war permit serious interruptions of its railway service. But friction, or even the mere want of the best possible understanding and the closest co-operation between the managements and the men might have results only less baneful than actual interruptions of the service. Such

want of understanding and co-operation would prevent the railways from being operated with the maximum practicable efficiency, and, as President Wilson implies in his appeal, it is essential to the welfare of the nation that during the war all its industrial operations shall be conducted with the greatest efficiency attainable.

In the circumstances, the duty of the managers and the employees of the railways becomes very plain. We speak now, not of their duty to the railways or to each other, but of a much higher duty. It becomes their duty to their country and to mankind to forget, or at least for the term of the war to hold in abeyance, every act, and in so far as may be possible, every thought and feeling, which would tend, even temporarily, to interfere with the efficiency of railway operation.

It is needless to emphasize the important part which the railways must play in this war if it lasts long. They must, unless the prosperity of the country is to be destroyed, go on handling the commercial traffic of the country. They must, in addition, handle troops, munitions and military supplies of all kinds, both for our own army and navy and for the armies and navies of the allies. Present indications are that this will mean an enormous increase in the burden imposed upon them. Are they prepared to carry it? They are assuming it at a time when they have just shown that they are almost unable to handle the present traffic of the country. There are almost insurmountable difficulties in the way of the increasing or even maintaining the number of railway employees, in spite of the fact that for more than a year past it has been impossible for the managements to get enough labor properly to maintain their properties. It is impossible for them to get the normal amounts of new equipment, in spite of the fact that the equipment they already have is inadequate and is rapidly getting into an unsatisfactory condition. How, then, are the railways going to be enabled to cope with the enormously difficult problem with which they are confronted?

They can be enabled to cope with it successfully in only one way, and that is by a great increase in the efficiency of the personnel of their organizations. They can be enabled to cope with it only by every officer and every employee exerting himself to the utmost to do more than he has heretofore done in every hour's work, in every day's work and in every week's work. Since the railways cannot make needed additions to their equipment, they must greatly increase the traffic handled with every car and every locomotive. Since they cannot get needed additional employees they must move a largely increased traffic per employee.

Are such increases in the efficiency of the equipment and the employees practicable? Everybody who knows the conditions in the railway industry knows that all that is needed to secure them is to get infused into and throughout the railway organizations the right spirit. The men who stay behind to work in the industrial army must get the same spirit as those who go to the front to serve in the fighting army. They must get the spirit of self-sacrifice and of patriotism; and they will get it if they will only recognize the plain fact that so long as this war goes on they will be working, not merely for themselves or for the particular industry in which they are employed, but for their country and for humanity. Because of the peculiar dependence of the nation upon the railways it is peculiarly vital that all those connected with them should become infused with this spirit, and that as a result the efficiency with which every man on the railways does his work shall be increased to the utmost.

Will the railways of the United States play well their important part in this great crisis? That will depend not merely or mainly upon the stockholders of the railways or upon their 16,000 officers, but also to a very great extent upon their almost two millions of employees. If the rail-

ways do not play their part well that fact will cast everlasting shame upon their entire organizations. A "slacker" on the railways at this time is a traitor to America. On the other hand, if the railways do play their part well that fact will reflect everlasting credit upon the character, the loyalty and the patriotism of their organizations, including every class of their officers and employees.

## SHIPPERS NEED SERVICE MORE THAN LOW RATES

SOME of the most important shippers' organizations of the country seem disposed to recognize the pressing need of the railroads for more revenue. At a meeting of shippers' associations held at Chicago on April 13, to determine what action should be taken in regard to proposed rate advances, a substantial number attending staunchly opposed the passage of a resolution demanding a full investigation by the Interstate Commerce Commission and affirmed the carriers' contention that an emergency exists demanding speedy relief. Representatives of organizations like the National Industrial League, the Chicago Association of Commerce, and the Illinois Manufacturers' Association, which have fought rate advances in the past, voiced their objections to any action calculated to hamper the Interstate Commerce Commission in handling this case in such a manner as it deems fitting. Men who had spent much of their energies in recent years in opposing rate increases rose to their feet on this occasion and contended that service, not rates, is the prime consideration for American shippers.

Ever since the regulation craze took hold of this country the commissions have united and the public has indorsed them, in reducing rates to a point little above confiscation. The disastrous effect has only became apparent recently when greatly increased traffic resulting from the unusual demands of underproductive Europe upon American industry and agriculture found the transportation system wanting. Needed locomotives and cars were not available and could not be obtained except at almost prohibitive prices and slow deliveries. Needed side tracks, yards, freight houses, elevators, shops, docks, and new mileage, were not in existence and could not be built because of a shortage of funds, materials and labor. The public policy which made it impossible for the transportation machine to prepare for the peak load, and by reducing revenues discouraged the intensive and extensive development of railroad properties, has borne bitter fruit. It is at least encouraging that a large proportion of the American shipping public seems to realize, at last, that adequate service, and not low rates, is the desideratum of a sound railway management, as well as of sound regulation.

From the division of opinion manifested at the Chicago meeting of April 13, it appears that the manufacturing and mercantile interests are largely arrayed against the agricultural interests in favoring fair play to the railroads. Among the reasons assigned for this alignment is that the manufacturers are better able to appreciate the greatly increased expenses which are reducing railway earnings, because they have had occasion to purchase many of the same materials bought by the carriers.

It is by no means certain that the true sentiment of the agricultural interests was expressed through their more or less self-constituted representatives at the Chicago meeting. There was every evidence that the meeting was arranged by professional agitators and pettifogging lawyers working up business for themselves, and packed with hand-picked representatives of shippers' organizations predisposed to fight rate advances for their own selfish reasons. This view is supported by the fact that those desiring admission to the conference were asked to sign a card committing themselves

on the very point which the meeting was called to determine, i.e., whether shippers should demand a full investigation of the proposed advances.

At any rate, it is hard to believe that intelligent farmers and stock raisers looking to their own selfish interests, are opposed to fair increases in rates. At the present time the prices of farm products are the highest ever known. At no time in the twenty years previous to 1916 was the farm value of corn more than 70 cents a bushel, and in 1896 it was as low as 21.5 cents. On April 1, 1917, the farm value of corn was \$1.13 a bushel. The farm value of wheat in the two decades previous to 1916 was never more than 99 cents, and in 1898 was as low as 58.2 cents. On April 1, last, the average farm value of wheat in the United States, as reported by the government, was \$1.80. Oats, which never had a farm value of more than 47.2 cents between 1895 and 1915, and reached the low figure of 18.7 cents in 1896, had a farm value, on April 1, or 61.5 cents per bushel.

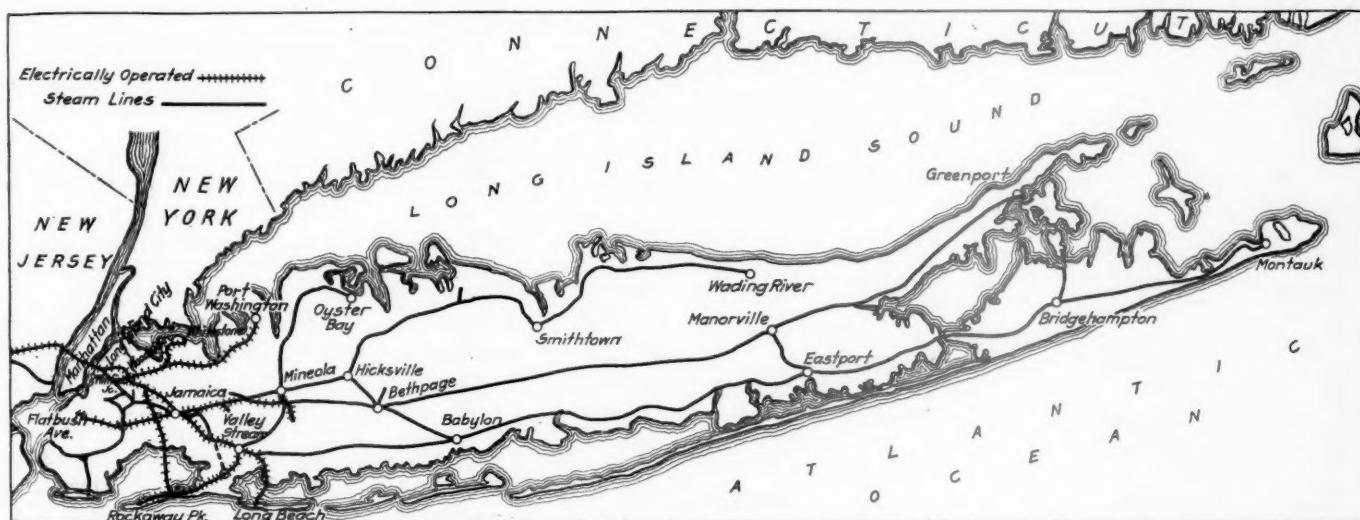
Grain and stock shippers are crying incessantly for cars and other transportation facilities which do not exist because the railroads have been too poor to build them and which will not be provided unless they get additional funds. What they need is not low rates, which they have already, but more cars. A war crisis has brought a demand for greater food production to save our country and its allies from the danger of famine. New lands can be cultivated only if lines are extended into virgin country, and the extensive development of our transportation system is impossible without adequate credit, which in turn presupposes increased rates. It would be indeed ironical for the farmers

By opposing higher rates, or permitting others to do so in their names, the farmers are injuring not only their country in time of peril but themselves. If they desire a continuation of the unprecedented prosperity they are enjoying—and there is no reason to believe that they are averse to it—they will not further that end by a niggardly attitude toward the railroads. The pretended friends of the farmers who in this emergency, for their own selfish interests, are opposing advances in rates, are, in fact, the worst enemies of the farmers.

### LONG ISLAND

**I**N dismissing the suit brought by Dick Brothers & Cole, brokers, against the Long Island, Justice Lehman by not himself expressing any opinion as to the value of the great expenditures which have been made in the last ten years on this property found unqualifiedly that these expenditures were in accordance with a far-sighted policy of betterment analogous to the policy pursued by the Pennsylvania. The betterment program which was actively entered into about 10 years ago was to provide for the needs of from 20 to 50 years ahead. Actually the growth of traffic has in some cases already utilized almost to capacity certain facilities provided under this plan. Other improvements are still 20 to 30 years, presumably, in advance of present requirements.

The Long Island operates only 397 miles of railroad, but the population it serves is enormous. One out of every four residents of the entire State of New York lives on



**The Long Island Railroad**  
Electrified lines shown crosshatched.

to oppose an advance in rates when they themselves are receiving for their products the highest prices in history at the same time that the railroads are receiving for their service the lowest rates ever charged in any country except India, and when the need of the farmers is for the additional railway facilities, which can be provided only through additional railway earnings. During the fiscal year 1916 the average freight rate per ton per mile in this country reached the low figure of 7.07 mills. Simultaneously with this reduction of rates to a new low basis the construction of new mileage, which totaled between 4,000 and 6,000 miles annually between 1899 and 1910, inclusive, has been reduced to hardly 1,000 miles per year during the last few years. Obviously, if the United States is to continue to grow agriculturally it must have a more intensive and extensive transportation development.

Long Island, or to put it picturesquely, the population of Long Island is equal to the combined population of New Hampshire, Vermont, Utah, Montana, Idaho, Arizona, Delaware, Nevada and Wyoming.

When the tubes from the Long Island station at 33rd Street and Seventh avenue, Manhattan, to Long Island were first opened there was a boom in Long Island real estate. In 1911 there were 7,429 dwellings, 820 stores and 44 factories erected on the island, tributary to the Long Island, and in 1912, 7,793 dwellings and 753 stores. In 1914 there was a considerable slump but in 1915 and 1916 building was resumed, not quite at a boom rate but nevertheless on a large scale. In 1916, 7,196 dwellings and 888 stores were built tributary to the Long Island.

The tubes under the East river contain four tracks and in the morning and afternoon in Summer these tubes are

used to capacity. Between four and five in the afternoon there is a Long Island train leaving the station in Manhattan every three minutes. In this connection it is interesting to note that the Long Island has all of the cars which it runs into Manhattan equipped for automatic stops and has automatic stops in operation in the East river tubes.

Were it not for the abnormal increases which are taking place in the fuel, labor and material costs, it is safe to say that the calendar year 1916 would have marked the definite turning of the corner for the Long Island.

For the first time since 1909 the Long Island earned a surplus over and above interest and rental charges. Total operating revenues in 1916 amounted to \$14,972,000, an increase of \$1,418,000 over 1915. Operating expenses amounted to \$9,927,000, an increase of \$800,000. The only large change in non-operating income or deductions therefrom was an increase of \$192,000 in the debit balance of hire of equipment. After paying fixed charges there was \$242,000 net income, comparing with a loss of \$160,000 in 1915.

The total number of passengers carried in 1916 was 45,803,000, an increase of 7.44 per cent over 1915. The average passenger journey—14 miles—was almost the same in both years, and the average revenue per passenger per mile was 1.301 cents, a decrease of 0.016 cents. The tonnage of freight carried totaled 5,135,000, an increase of 692,000 tons, or 15.56 per cent. Because of a shorter average haul the increase in ton mileage was not so great, being 10.46 per cent; the total in 1916 was 118,093,000. Of the Long Island's total revenue approximately only a quarter comes from the operation of freight trains, the other three-quarters being from passenger fares and other passenger train revenue. It is particularly hard to adjust railroad expenses to traffic in the passenger service. A decrease in passenger travel cannot be offset by a decrease in number of trains run, while an increase in passenger traffic is accompanied by an increase in the ever present pressure brought to bear on the management to add to its train service. With a 7.44 per cent increase in passenger business the Long Island increased its passenger train mileage by 5.50 per cent, the total passenger train mileage in 1916 being 5,589,000, the average number of passengers per train being very high, as would be expected on a road doing so largely a commutation and suburban business. In 1916 the average was 118, an increase of 3, as compared with the previous year. Even with this high average, however, the revenue per train-mile is not high because of the very low rates (a large proportion of the passengers use commutation tickets). The average revenue per train-mile in 1916 was \$1.53.

The increase of 10.46 per cent in ton mileage was handled with an increase of only 4.50 per cent in freight train mileage. The Long Island gets a high ton-mile rate because of the short haul—an average of 23 miles—and the classes of commodities carried. It is true that a fairly large proportion of the total tonnage is anthracite coal, but this coal is for local domestic consumption and because of the character of the service which the Long Island has to perform in connection therewith, its division of the through rate is high. Of the total 5,135,000 tons carried by the Long Island in 1916, 1,399,000 tons was anthracite coal. There was 443,000 tons of l. c. l. freight carried in 1916, an increase of 34,000 tons. The nature of the Long Island's freight business is reflected in the average trainload, which in 1916 was 211 tons. That was an increase of a little over 11 tons over 1915. The nature of the freight business is also reflected in the expenses per freight train mile (the Long Island divides its freight and passenger expenses). In 1916 this averaged \$4.93, an increase of 69 cents over 1915.

If the offer which the Pennsylvania Railroad, which now

owns the majority stock of the Long Island, has made to minority stockholders is accepted, the Pennsylvania will become the sole stockholder of the Long Island. This is important only as it will relieve the management of the danger of suits brought by minority stockholders with the hope of "holding up" the management, since the management will still be under the same obligations which it is now to operate the road to the best interests of security-holders other than stockholders.

The completion of the New York Connecting will be of advantage to the Long Island, inasmuch as it will give its shippers an all-rail connection with New England.

The Long Island, to an even greater extent than most other roads, faces a particularly serious situation in regard to the cost of its fuel coal. The price that the company will have to pay in 1917 will be nearly a dollar a ton higher than that paid in 1916.

The following table shows the principal figures for operation in the calendar year 1916 as compared with 1915:

	1916	1915
Average mileage operated.....	397	397
Freight revenue .....	\$4,397,210	\$3,865,746
Passenger revenue .....	8,541,876	7,951,322
Total operating revenue.....	14,971,839	13,553,780
Maintenance of way and structures.....	1,656,155	1,529,223
Maintenance of equipment.....	1,662,203	1,517,419
Traffic expenses .....	139,619	128,898
Transportation expenses .....	5,991,500	5,499,680
General expenses .....	414,055	374,197
Total operating expenses.....	9,927,208	9,126,922
Taxes .....	879,047	934,822
Operating income .....	4,156,845	3,486,602
Gross income .....	4,837,036	4,220,237
Net income .....	241,736	*161,150

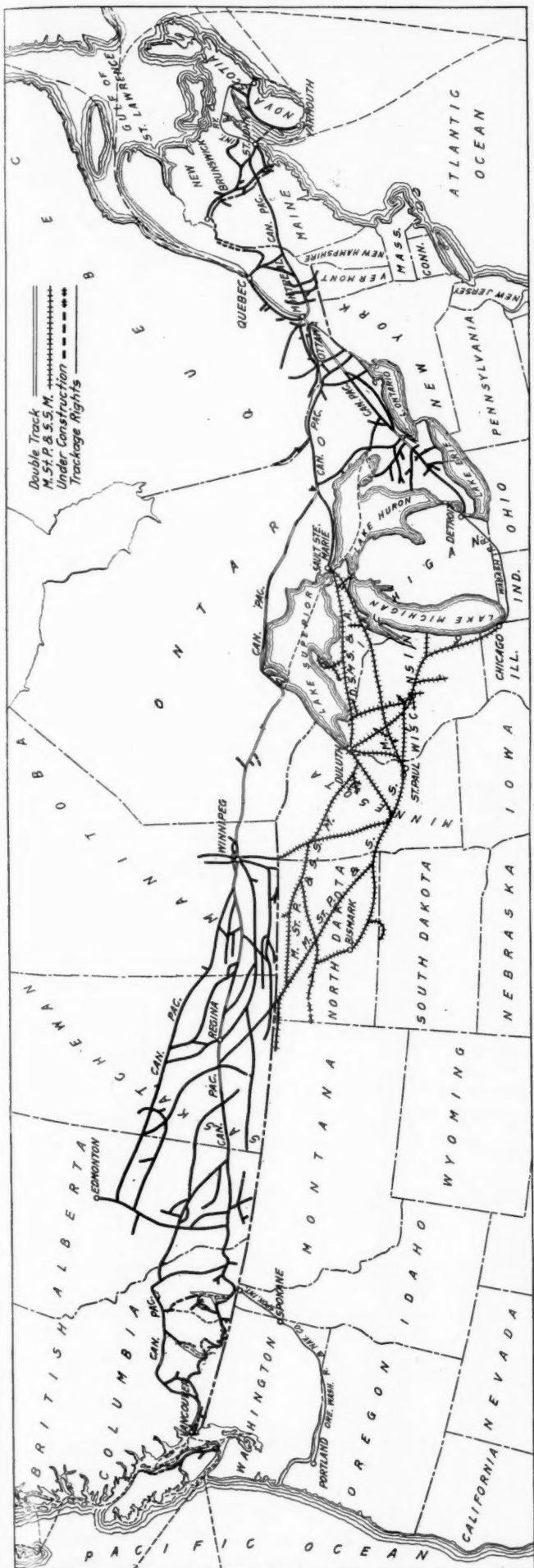
\* Deficit.

## CANADIAN PACIFIC

THE development and management of the great Canadian Pacific Railway has for years been the admiration of American railroad men, and as Lord Shaughnessy, president and chairman, says in his report to stockholders, "No company in the British Empire stands in higher credit among American investors than the Canadian Pacific \* \* \*;" and no wonder. In the half year ended December 31, 1916 (the company has changed its period for making reports to the calendar year) the Canadian Pacific did within a fraction of one per cent as much freight business as in the entire 12 months ended June 30, 1915. The company actually had over \$2,000,000 more surplus, after paying fixed charges, in the last half year 1916 than in the full 12 months of the fiscal year 1915. Gross earnings in the calendar year ended December 31, 1916, amounted to \$139,730,000, as compared with gross earnings in the calendar year ended December 31, 1915, of \$109,397,000. Net amounted to \$50,476,000 in 1916 and to \$43,525,000 in 1915. Moreover, this net was arrived at after charging to maintenance of way expenses the value—\$1,665,000—of the 15 miles of railroad abandoned when the Connaught tunnel was put in operation in the last half of 1916.

Canadian Pacific as an investment is of especial interest now to American investors because the securities issued, payable in pounds sterling and held in Great Britain, are to be borrowed from their holders by the British government and deposited with the Canadian Pacific as security for an issue totaling, if all the pounds sterling securities are deposited, \$198,980,000 20-30 year 5 per cent collateral trust bonds, payable in dollars in New York or Montreal. Presumably, of course, these collateral trust bonds will be sold to American investors by the British government or will be the basis of loans here. In either case the present prospects are that most of this huge issue of Canadian Pacific securities will be absorbed by American investors.

The Canadian Pacific has had to face increases in labor and material costs similar to those which roads in the United States are struggling with. Last year there was a threatened



The Canadian Pacific System

strike of trainmen on the Canadian Pacific, and while in Canada there is a law which, if enforced, would prevent a strike until after an investigation and report on the merits thereof by a government appointed board, the Canadian Pacific, rather than endanger continuous operation, granted the demands of the trainmen without such an investigation.

In the calendar year ended December 31, 1916, transportation expenses amounted to \$42,385,000, comparing with \$33,119,000 in 1915. This is an increase of 28 per cent. The number of tons of revenue freight carried one mile totaled 1,510,000,000 in 1916, comparing with 1,014,000,000 in 1915, an increase of 49 per cent. Passengers carried one mile totaled 1,359,000,000 in 1916 and 1,177,000,000 in 1915, an increase of 15.41 per cent. The average revenue freight trainload was 519 tons in 1916, an increase of 50 tons, or 10.65 per cent, over 1915, and the increase in non-revenue freight per train was even greater, so that the total trainload averaged 573 tons in 1916, or 11.19 per cent higher than in 1915.

Mention was made in these columns six months ago of the extraordinarily good results obtained in the fiscal year ended June 30, 1916, in bringing up the average carload through an appeal to the patriotism and business sense of fairness of shippers. In the fiscal year ended June 30, 1916, a gain of over 16 per cent was made in carloading, including company material, the showing for revenue freight alone being even better—20 per cent. Comparing the calendar years 1916 and 1915, the average carloading of revenue freight per loaded car in 1916 was 22.87 tons, as compared with 21.21 in 1915, an increase of 7.85 per cent; and of all freight, including company freight, 25.22 tons in 1916 and 23.28 tons in 1915, an increase of 8.33 per cent.

The average ton-mile rate received by the Canadian Pacific in the calendar year 1916 was 6.48 mills, and in 1915, 6.88 mills, a decrease of 5.81 per cent. The following table shows the comparative quantities of various classes of traffic carried in the calendar years 1916 and 1915 (the Canadian Pacific does not state all of the quantities in tons):

	1916	1915
Flour (bbls.) . . . . .	11,119,890	8,940,310
Grain (bu.) . . . . .	256,106,690	219,388,556
Livestock (head) . . . . .	2,172,437	2,524,603
Lumber (ft.) . . . . .	3,017,964,134	2,376,174,667
Firewood (cords) . . . . .	289,471	263,384
Manufactures (tons) . . . . .	8,871,928	6,570,535
Other articles (tons) . . . . .	8,487,785	7,367,927

During the last half of 1916 the Canadian Pacific spent \$1,050,000 for additions and betterments on its own lines and \$525,000 on its leased lines. This is, of course, a small amount. The Canadian Pacific very properly is making only such improvements as it would be false economy to postpone. Labor in Canada is scarcer than it is in the United States; scarcer, in fact, than it is possible for Americans who have not been through Canada during the last six months to possibly realize. Canada is giving of her very best to the battlefields of France and extensions and improvements of the Canadian Pacific under these circumstances would be unpatriotic and foolish. The Connaught tunnel at the summit of the Selkirk mountains, and the longest tunnel in the world, was already being built in 1914 and was completed in the last half of 1916. The tunnel was described in the *Railway Age Gazette* of May 12, 1916, page 1044.

It would, of course, be shortsighted to postpone actually imperatively needed betterments as to permit additions that were not imperatively needed. For the calendar year 1917 the Canadian Pacific directors have appropriated \$4,179,000 for additions and betterments. Of this amount \$841,000 will be spent for additional wharf accommodations at Vancouver and \$792,000 for transfer tracks, crossing sidings and enlargement of yards. The remainder will be required for a great number of small but much needed improvements.

at different places over the whole of the 13,000 miles of line.

The Canadian Pacific's balance sheet for December 31, 1916, is a good exhibit against which to sell securities to American investors. The company had \$57,076,000 cash on hand and \$5,979,000 temporarily invested in war loans, comparing with \$41,582,000 cash on hand and \$5,273,000 temporarily invested in war loans on June 30, 1916. There are no loans and bills payable, and with the exception of the small issue—\$3,650,000—of Algoma branch first mortgage bonds, there are no mortgage bonds outstanding against the Canadian Pacific.

The following table shows the operating revenues and expenses for the calendar year 1916 and 1915, and net:

	1916	1915
Mileage operated .....	13,768	13,377
Freight revenue .....	\$96,454,896	\$72,450,028
Passenger revenue .....	26,849,282	23,309,847
*Total operating revenue .....	139,729,687	109,397,248
Maintenance of way and structures .....	17,249,500	10,006,682
Maintenance of equipment .....	18,908,464	12,820,747
Traffic expenses .....	2,940,872	2,837,971
Transportation expense .....	42,385,348	33,118,705
General expenses .....	4,345,852	3,949,240
†Total operating expenses .....	89,253,188	65,872,010
Net operating revenue .....	50,476,499	43,525,238

\* Includes revenue from mails, sleeping car, express, telegraph and miscellaneous.

† Includes parlor and sleeping car, lake and river steamers, and commercial telegraph expenses.

The following table shows the income account of the Canadian Pacific for the six months ended December 31, 1916:

Gross earnings .....	\$76,717,965
Operating expenses .....	45,843,200
Net earnings .....	30,874,766
Fixed charges .....	5,132,551
Surplus .....	25,742,215
Appropriation for pensions .....	200,000
Transferred to special income .....	1,144,071
Dividends paid from railroad earnings .....	10,713,638
Surplus from railroad earnings .....	13,684,505
Total special income (land sales, dividends on stock owned, etc.) .....	14,822,252
Dividends paid from special income .....	1,950,000
Surplus from special income .....	12,872,452
Canadian Pacific surplus for half year .....	26,556,957

### DELAWARE & HUDSON

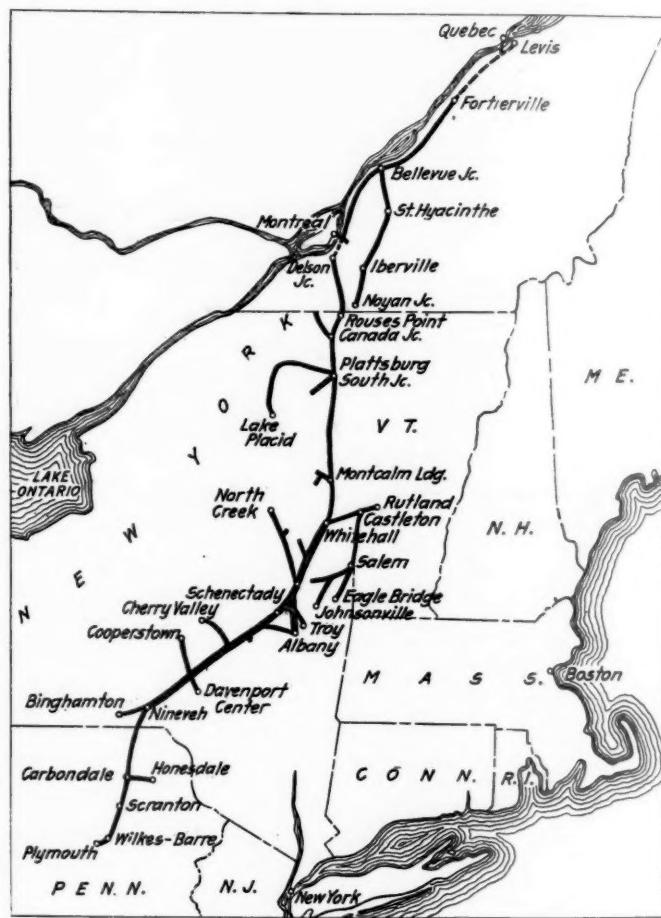
AT no time during the entire calendar year 1916, nor during the three months since, has the Delaware & Hudson been congested, and such embargoes as were placed against receiving freight were on freight destined to other lines and were necessitated only because of the inability of the other lines to take deliveries. Notwithstanding this fact, however, operating expenses in the calendar year 1916 were abnormally high. Although the average trainload of freight was increased from 653 tons in 1915 to 718 tons in 1916, an increase of almost 10 per cent, transportation expenses increased 19 per cent, while total ton mileage increased 10.6 per cent and passenger mileage less than 10 per cent. Maintenance expenses, especially maintenance of equipment, showed very large increases and the result of all this was that although total operating revenues amounted to \$26,634,000 in 1916, an increase of \$2,847,000, net was \$441,000 less in 1916 than in 1915 and totaled \$8,523,000. There was an even greater proportionate loss in net in the coal mining department.\*

The operating income of the coal mining department in 1916 was \$123,000, or \$653,000 less than in 1915. This department has other income (dividends and interest) of \$704,000, so that the gross income of the coal department was \$828,000 in 1916, as compared with \$1,481,000 in 1915. The Delaware & Hudson after paying interest and rentals had a surplus available for dividends of \$4,158,000 in 1916, comparing with \$6,041,000 in 1915. The per cent earned on the company's \$42,503,000 stock was 9.78 in 1916 and 14.28 in 1915. The company is paying 9 per cent dividends. In the first two months of 1917 the net earnings of the coal

\*The Delaware & Hudson operates 909 miles of railroad and also owns extensive anthracite coal mines which it operates. The Delaware & Hudson Company sells the coal that it mines at the mine's mouth to a sales company or others, thus complying with the commodities clause.

department were at a rate even less than in 1916. In March, however, the corner was turned in the coal mining department and this department is now showing substantially increasing net.

Before discussing the railroad operations in detail a brief review of the situation in the coal mining department is interesting. In May, 1916, a new agreement was made with the miners and their laborers which, among other things, gave the employees nearly 16 per cent increase in rate of wages. In part this was the effect of reducing the working day from nine to eight hours. The miner himself is paid on the basis of the amount of coal he mines each day. His helper, however, is paid on a time basis. It has become a custom for the miner to do little more than bore the holes and prepare the dynamite charge for blasting. After the blast the miner was in the habit of going home and the helper shoveled the coal into the cars and cleaned up the room or chamber assigned to his miner. Under this arrangement the miner working four to five hours could provide work



The Delaware & Hudson

for a helper for nine hours, but when the helper's time was reduced to eight hours there was a curtailment of the output of the miner and thus a reduction in the amount of wages received per day. There was also in 1916 a scarcity of helpers. The miners were not taken away to any great extent by munition makers and other manufacturers but the helpers were. The result was that it was impossible to keep up the tonnage output of the mines and this is one of the governing factors in the ratio of expenses to revenue. The increase in the rate of wages of miners and miners' helpers was added to the price at which the mining department sold the coal, but for the causes mentioned above the increase in the expenses of the mining department was greater than the percentage increase in rate of employees' wages. It is these conditions that are reflected in the figures for net revenue

in the calendar year 1916 and in the first two months of 1917. The miners, however, have now to a large extent adjusted themselves to the new conditions. They are now helping to load the coal so that their output will go back to the average that it was before the reduction of helpers' time from nine to eight hours. In other words, the present indications are that unless something unforeseen occurs the net revenue to the Delaware & Hudson Company from its coal mining department in 1917 will be pretty nearly as good as in 1915.

The prospects are not so bright for the railroad department. The reduction in anthracite rates ordered by the Interstate Commerce Commission took effect April 1, 1916, and although operating revenues amounted to \$26,634,000 and were nearly 12 per cent greater than in 1915, the earnings on the movement of anthracite coal were \$270,000 less than they would have been had the former rates been in effect. The total number of tons of freight carried in 1916 was 22,865,000, an increase of 1,899,000 over 1915. Of the total tonnage carried in 1916, 14,482,000 tons was products of mines, being 63.34 per cent of the total tonnage; and included in this products of mines was 9,301,000 tons of anthracite coal. This was 690,000 tons less than the anthracite coal tonnage carried in 1915; but to offset this there was a gain of 726,000 tons in the amount of bituminous coal carried and 687,000 tons in the amount of ore carried. The tonnage of manufactures was 3,950,000, or 17.27 per cent of the total. In 1915 the tonnage was 3,356,000, or 16.01 per cent of the total; the increase was 394,000 tons. Agricultural products and lumber together furnished only about 10 per cent of the Delaware & Hudson's tonnage, and while there was a falling off in tonnage of flour and other mill products, there was a good gain—371,000 tons—in the tonnage of lumber.

The prospects for the present calendar year are that the Delaware & Hudson will do as large, or even a larger freight business, depending on the ability of its connections to take deliveries, than it did in 1916. It is in the cost of doing this business that the rub comes. It is probable that the additional expenses on account of the eight-hour law will be even greater than the managements figured before the law went into effect, but without this law in effect the amounts paid to all classes of employees in 1916 were mounting rapidly. Freight-train mileage in 1916 was a little less than nine per cent greater than in 1915; passenger-train mileage increased between one and two per cent; the wages of train-enginemen over 17 per cent; and wages of trainmen over 16 per cent. Since the Delaware & Hudson was not congested, these increases, out of proportion to the increase in train mileage with the same wage schedules in effect, are to be accounted for by a lower standard of efficiency on the part of enginemen and trainmen. There was a substantial increase in the wages of station employees and of like classes of labor. There is every prospect that the railroads will have to grant further substantial increases to these employees in order to hold them.

Maintenance of way expenses and, to a much greater extent even, maintenance of equipment expenses are being affected by the necessity for paying abnormally high wages to labor in competition with munition and other manufacturing concerns and by the abnormally high cost of materials. Maintenance of way and structures cost \$2,128,000 in 1916, an increase of \$276,000. This was notwithstanding the fact that only \$189,000 was spent for ties, as compared with \$331,000 in 1915. Maintenance of equipment cost \$4,971,000, an increase over 1915 of \$1,268,000, or 34.23 per cent. From this increase, however, should be subtracted the amount charged for depreciation, amounting to \$355,000. Previous to 1916 the Delaware & Hudson had not made monthly charges for depreciation, since the management was carrying the book value of the equipment at a much lower

figure than the actual value. A revaluation of the equipment was made at the beginning of the year and the book value of equipment was increased by \$2,915,000 and this amount was credited to depreciation reserve. The actual increase in the amount spent for maintenance of equipment in 1916 as compared with 1915 was \$913,000, or 24.64 per cent. To some extent the maintenance of equipment charges were increased by the charges to operating expenses coincident to making additions and betterments. The Delaware & Hudson has been putting steel underframes on 1,000 40-ton capacity gondola cars, and while this work is a betterment and its cost chargeable to property account, there are very considerable incidental expenses which are charged to repairs of freight cars. The same is true of equipping locomotives with superheaters.

Even assuming that the railroads get the 15 per cent increase in rates which they are asking for, this increase will not go into effect until June 1, so that for 1917 the Delaware & Hudson will get only seven-twelfths of fifteen per cent. This will not by any means offset the increase which has taken place since 1915 in the cost of doing the same work.

It is a great pity that such a comparatively small number of people ever read railroad annual reports. The president's letter in the Delaware & Hudson's annual report is a remarkably broad, keen discussion of the economic questions, not only directly connected with the transportation problem, but also incidental thereto. Were such a treatise as this to appear as an article in the Atlantic Monthly or North American Review it would be widely read and discussed. It is an intensely interesting survey of present economic conditions in this country and ought to be read by a vastly larger number of people than the security-holders of the Delaware & Hudson.

The table below shows principal figures for 1916 and 1915:

	1916	1915
Average mileage operated.....	909	909
Coal freight revenue.....	\$11,769,005	\$11,311,690
Merchandise freight revenue.....	10,748,020	8,788,365
Passenger revenue .....	3,124,317	2,774,595
Total operating revenue.....	26,634,426	23,787,519
Maintenance of way and structures.....	2,127,853	1,852,166
Maintenance of equipment.....	4,970,920	3,703,382
Traffic expenses .....	541,580	315,992
Transportation expenses .....	9,513,925	8,007,980
General expenses .....	957,518	775,646
Total operating expenses.....	18,111,095	14,823,626
Taxes .....	756,455	680,119
Operating income .....	7,766,877	8,283,774
Gross railroad income.....	8,170,991	9,356,838
Net railroad income.....	3,338,645	4,515,885
Gross income—coal department.....	827,552	1,480,800
Net income—D. & H. Co.....	4,158,372	6,071,441
Dividends .....	3,825,270	3,825,270
Surplus .....	333,102	2,246,171

## NEW BOOKS

*Workmen's Compensation Laws of the United States and Foreign Countries.*  
Published by the United States Department of Labor, Bureau of Labor Statistics. 960 pages. Size, 6 in. by 9 in. Bound in paper.

This book, No. 8 of the workmen's insurance and compensation series, brings up to date the bureau's compilation of compensation laws in the United States and other countries. At the present time, although the first state commissions to study workmen's compensation were appointed only eight years ago, workmen's compensation laws have been enacted in 32 states and in Alaska, Hawaii, Porto Rico and the Philippine Islands. A section of the book is devoted to the progress that has been made in this kind of legislation, another to a comparison of the principal features of the laws, and a third to the constitutionality and construction of statutes. An analysis is given of the laws in the several states and about 50 pages are used to discuss the practice in foreign countries, analyses being given of the laws of these countries. An appendix of 600 pages, two-thirds of the book, gives in full the text of the state and Federal workmen's compensation laws of the United States. Incorporated in the book there is also a table 24 in. by 48 in. in size charting the principal features of these laws.

# Correspondence From Our Washington Editor

## Preparing the Railways for War—Rate Advance Case —State Discrimination Against Interstate Commerce

**A**S a result of action taken at a meeting in Washington last week of executives representing most of the railways of the country, which will be confirmed by the signatures of those who were not represented, the railways of the United States have practically pooled their facilities for the benefit of the government and have expressly agreed to accept the direction of an executive committee of five men in all their operations having a direct or indirect bearing on the exigencies created by a state of war.

The plan of organization by which the entire problem of the co-operation of the railways with the government was committed to the Special Committee on National Defense of the American Railway Association, has been fully described in this and previous issues of the *Railway Age Gazette*. A nucleus for the organization was afforded by the Special Committee on Co-operation with the Military Authorities organized by the American Railway Association last year, which enabled the railways to make a remarkable record for efficiency in the transportation service connected with the mobilization of the National Guard.

A method for still more closely co-ordinating the railways with the other resources of the country for national service was provided and the vital importance of the railways in any plan of national defense was recognized, in the creation of the Council of National Defense and its Advisory Commission by a section of the army appropriation bill passed by Congress last year, which particularly directed the council and the commission to study the transportation question in its relation to military purposes. Daniel Willard, president of the Baltimore & Ohio, was appointed by the President as a member of the Advisory Commission and given special charge of the department of transportation and communication, subsequently being made chairman of the commission. In organizing committees in his branch of the work Mr. Willard was able to take advantage promptly of the American Railway Association organization and through his efforts the railways were the first industry to tender to the Government a perfected organization and to arrange a definite plan of action for extending their co-operation in plans for national defense. The American Railway Association Special Committee on National Defense was organized in New York on February 16 and on March 1 held a meeting at Washington at which general policies were outlined and the work of organization was gotten under way. Plans for the co-operation of the railways with the military authorities have been worked out along lines largely developed by Lieutenant-Colonel Chauncey B. Baker of the Quartermaster Corps, who for a number of years has made an extensive study of military transportation.

The foregoing arrangements were worked out with reference to a general policy of national defense and without definite knowledge that the country would soon be at war. The actual declaration of a state of war made it necessary to strengthen the organization and to prepare to deal promptly with emergency conditions. Mr. Willard then called about fifty of the leading railway executives of the country to Washington, explained to them the conditions they would be called upon to face in connection with the participation of the United States in the war, superimposed upon the heavy increase in traffic that has already been placed upon them, and the railway men grasped the opportunity for service in a big way.

Just how much of a change in the methods of railway operation the creation of this organization will involve has not

yet been outlined because the executive committee is to hold its first meeting probably this week, but under the resolutions upon which its authority is based it will have very broad powers. The roads pledged themselves "to co-ordinate their operation in a continental railway system, merging all their merely individual and competitive activities in the effort to produce a maximum of national transportation efficiency," and the central organization created was given "general authority to formulate in detail and from time to time a policy of operation of all or any of the railways," which policy "shall be accepted and earnestly made effective by the several managements." The railways also agreed by signature to the direction of the executive committee in all matters to which its authority extends as expressed by the general resolution.

The executive committee, therefore, if it considers such steps necessary, may order the discontinuance of duplicated competitive service, prescribe the distribution of new and present power and equipment in accordance with the most pressing requirements, and may even set aside certain lines for particular kinds of service. It may require the improvement or reconstruction of certain lines that may be called upon to meet unusual demands for military purposes or it may turn over rails or other supplies ordered by certain roads for the use of any of the allies, if necessary. It is quite possible that in order to produce the greatest possible efficiency in transportation, competitive passenger service may be rearranged in order to avoid waste and it is probable that some drastic orders will be made for the delivery of freight cars by lines that have an excess to lines requiring them for the transportation of freight that should be moved promptly. With this idea in view, the Car Service Commission has been made a sub-committee of the Special Committee on National Defense.

The present organizations of the individual roads are to be continued in charge of their properties and the railroads will remain in the hands of their owners, instead of being taken over by the government as the roads were in England on the outbreak of war, but the railroad system of the United States is to be managed as one system and under the direction of one authority to the extent that may be necessary or expedient, just as if there were no separate organizations, and a state of efficiency will be made possible that could not be obtained except by one supreme authority. What arrangements will be made for preserving the interests of the individual roads remains to be seen, but, whatever they may be, the principal of the greatest good of the greatest number is to prevail. The fact that the roads are to retain their own autonomy under a representative plan of management of their own selection should be a source of great satisfaction as well as one of great responsibility.

An interesting sidelight on the importance of the plan adopted by the railways is afforded by the bill introduced in Congress last week by Representative Adamson to give the President power to take over the railroads, telegraph and telephone lines in whole or in part for military purposes, and to draft their officers and employees into the service of the government, or to direct the operation of certain lines without taking possession of them, compensation to be determined afterward by the Interstate Commerce Commission. This bill has the backing of the administration; in fact it is in accordance with suggestions made by the President at the time of the passage of the Adamson law, and Mr. Adamson was requested to draft it at a conference with the President a few days before the meeting of the railway executives.

It, therefore, represents a possibility which was faced by the roads in their preparations for facing the emergency of war and which still faces them if they do not succeed in conducting their affairs with a greater degree of public satisfaction than has attended their performance of the stupendous task already imposed upon them in handling the great increase in traffic resulting from the European war.

Apparently such a course as is proposed by the Adamson bill is made unnecessary by the prompt action taken by the railways, but apparently also its passage is desired by the administration in order to remove any possible question as to the complete authority of the President to deal with any emergency that may arise at any time. Whether it will meet with the approval of Congress is an entirely different question. The railways have no reason to oppose it because they ought to be able to make it unnecessary. If they cannot succeed in doing so it will have to come. But it is well known that organized labor has strenuous objections to being drafted into government service especially under a provision that would confine them to their accustomed pay for their services. This attitude is perfectly understood by Congress, and if precedent counts for anything, the effect it will have on Congress can probably be surmised.

#### PRELIMINARY HEARING IN RATE ADVANCE CASE

The program for the conduct of the 15 per cent general rate advance case, which the Interstate Commerce Commission has designated as Ex-Parte 57, began to take definite shape when the commission announced on Monday, in a telegram in response to a number of requests from representatives of the shippers, that an informal hearing will be held by the commission at Washington on Friday of this week, confined to the plan or method of procedure and the character of the investigation which should be had in connection with the request of the carriers for a general rate increase. The commission also stated that if tariffs are filed, hearings will be had later on the question of suspending them.

This will give the shippers practically their first opportunity to be heard by the commission, since the roads made known their intentions of applying for higher rates, on the question as to whether the commission's rules should be amended to allow the proposed increases to be filed in the form of supplements to existing tariffs and on the carriers' urgent requests that the investigation should be expedited in order to avoid suspending the new rates.

The railroad executive and traffic officers have held several informal conferences with the commission regarding details and methods of procedure while the views of the shippers have been expressed thus far in resolutions and letters and telegrams to the commission. It is expected that as soon as the questions of procedure have been settled hearings will be started promptly on the main question as to whether the roads are to get an increase.

Following the hearing before the commission last Tuesday, at which the roads were given an opportunity to explain their ideas as to the various details involved, a sub-committee composed of the chairmen of the various railroad traffic associations was appointed which spent some time in conference with the tariff board of the commission arranging the form of a uniform supplement to be used by all the roads in getting before the commission their application for an advance, should their request for the amendment of the tariff rules be granted. The traffic men also compiled lists of the rates and tariffs covered by outstanding unexpired orders of the commission, which they ask shall be included in the general advance, and as to which it may be necessary to make some special showing at the hearings. The uniform plan of supplement agreed upon is similar to a sample form filed with the commission by the southern roads. It will carry the numbers of the existing tariffs with an explanatory

statement that all rates in the tariffs named are advanced 15 per cent, as shown in an accompanying table of advanced rates. In this table the existing rates, from one cent up to the highest rate carried in the tariffs referred to, will be stated in one column and the rates plus 15 per cent will be stated in another column, eliminating fractions where less than one half and adding one cent where the fraction is more than one half. Explanatory statements will give the rule for handling fractions so that it will not be necessary to include in the first table all decimal rates. Such supplements may be filed to cover groups of tariffs or all tariffs applying to a single commodity.

The commission continues to receive numerous letters and telegrams from shippers, protesting against an advance, but more particularly against an advance without a thorough investigation. The views expressed are by no means unanimous, however, as was indicated when the shippers' meeting in Chicago last week nearly broke up in a row, and while the protests are by far the most numerous, there are many letters and resolutions favoring the granting of the railroads' application on the ground that it is essential to the welfare of the country to place the transportation industry in a healthy condition. Typical of the expressions of those who take this view is a telegram from R. T. Crane, Jr., president of the Crane Company, in which he said: "As large shippers with branches throughout the country, we feel the shortage of railroad equipment and think that the railroads should be allowed a reasonable increase in freight rates to enable them to maintain their equipment and service to meet the demands of the rapid expansion of the country."

Among the other firms and organizations that have indicated to the commission their approval of an advance are the following: American Live-Stock & Loan Company; Binghamton, N. Y., Chamber of Commerce; Toledo Commercial Club; Toledo Produce Exchange; Middletown, O., Chamber of Commerce; Lynn, Mass., Chamber of Commerce; National Hay Association; Huntingdon, Pa., Chamber of Commerce; First National Bank, Glens Falls, N. Y.; Oneonta, N. Y., Chamber of Commerce; Merchants' National Bank, Glens Falls, N. Y.; Peoples' Trust Company, Binghamton, N. Y.; Mansfield Milling Company, Mansfield, O.; Scranton Pump Company, Scranton, Pa.; First National Bank, Pittsburgh, N. Y.; Williams Drop Forging Company, Scranton, Pa.; E. W. Conklin & Company, Binghamton, N. Y.; Citizens' National Bank, Oneonta, N. Y.; Chamber of Commerce of the State of New York; Lea & Febiger, Philadelphia, Pa., and Railway Investors' League.

An incidental part of the advance rate case will be considered at a hearing before the suspension board of the commission on April 23 on the tariffs which had been filed before the general increase was asked, proposing an advance of 15 cents a ton on iron ore.

#### BILL TO AUTHORIZE PRESIDENT TO TAKE RAILROADS

For the purpose of removing any possible question as to the power of the President to use the transportation and communication facilities of the country in any way or at any time he may deem it necessary during war time, Representative Adamson, chairman of the House Committee on Interstate and Foreign Commerce, on Friday introduced in Congress a bill which not only gives the President power to take possession of railroad, telegraph and telephone lines and to draft their officers and employees into the service of the government, but also gives him power without actually taking possession to issue orders for the operation of any lines or parts thereof "for any public purpose apparently rendered necessary." The bill has the backing of the administration and is considered a part of the legislative war program. It is understood that it was drafted at the request of the President following a conference with Repre-

sentative Adamson on the preceding Sunday for the purpose of giving the President full authority to meet any emergency. This was before the meeting of the railway executives held on Wednesday, at which the executive committee of the Special Committee on National Defense of the American Railway Association was given authority to direct the operation of the railroads as a single system to the extent required by the war conditions.

The act to regulate commerce now carries a provision in section six "that in time of war or threatened war preference and precedence shall, upon the demand of the President of the United States, be given, over all other traffic, to the transportation of troops and material of war and carriers shall adopt every means within their control to facilitate and expedite the military traffic."

The provision of the bill giving the President power to take possession of the railroads is the same as that of a bill introduced at the last session of Congress in accordance with the recommendations made by the President for legislation to supplement the Adamson eight-hour law. Section 5 of the bill provides:

"That in case of actual or threatened war, insurrection, or invasion, or any emergency requiring the transportation of troops, military equipment, and supplies of the United States, the President of the United States, when in his judgment the public safety may require, is hereby authorized to take possession in whole or in part of any and all telephone and telegraph lines in the United States, their offices and appurtenances; to take possession in whole or in part of any or all railroad lines in the United States, their rolling stock, offices, shops, buildings, and all their appendages and appurtenances; to prescribe rules and regulations for the holding, using, and maintaining of the aforesaid railroad, telephone, and telegraph lines, or that portion of the same of which possession may be taken, in the manner most conducive to the safety and welfare of the United States; to draft into the military service of the United States and to place under military control any or all of the officers, agents, and employees of the railroad, telephone, or telegraph companies whose lines are so taken into possession; and said officers, agents, and employees shall be thenceforth considered as members of the Military Establishment of the United States, subject to all the restrictions imposed by the rules and articles of war."

It is also provided that the communication of intelligence over telephone and telegraph lines and transportation of troops, equipment, military property and stores, shall be conducted under the control and supervision of such officers as the President may designate, and whenever in his opinion the public safety no longer requires the continued possession by the United States of the railroad, telephone and telegraph lines, they shall be restored to the owners and that the damages suffered or the compensation to which the companies may be entitled shall be determined by the Interstate Commerce Commission, due regard being had to the terms of any land grants or contracts theretofore existing between any such company and the United States. During the time that the United States is in possession, the officers, agents or employees shall receive for their services such compensation as they were theretofore accustomed to receive for similar services.

Section 10 provides: "That in time of actual or threatened war, insurrection, or invasion, or any emergency requiring the transportation of troops, military equipment, and supplies of the United States, the President of the United States, when in his judgment the public safety may require it, is hereby authorized, without taking possession of any of the carrier lines described in section five hereof, to issue orders, either direct or through such persons as he may designate for the purpose, to any of the officers or persons

operating in any capacity any of the aforesaid carrier lines, to operate same or any part thereof for any public purpose apparently rendered necessary by such state of actual or threatened war, insurrection, invasion, or other emergency. And it shall be the duty of any and all such officers or other persons operating such carrier lines to obey strictly and conform promptly to such orders, and failure to comply shall render such officers or persons guilty of a misdemeanor and shall, upon conviction, be punished as prescribed in section nine hereof. When in accordance with such order hereinbefore provided any portion of said carrier lines shall be used for the benefit of the United States in performing any particular service so ordered, the damage suffered or the compensation due for such service to any railroad, telephone or telegraph company hereinbefore described by reason of obeying such order and performing such service under the authority conferred by this act shall be assessed, determined, and paid as hereinbefore provided by this act."

Another section of the bill provides that any person or persons who shall in time of war knowingly and willfully obstruct or retard the passage of the United States mail or the orderly conduct or movement of interstate or foreign commerce, or the orderly make-up, or movement, or disposition of any train, locomotive, car or other vehicle on any railroad engaged in interstate or foreign commerce, shall be deemed guilty of a misdemeanor and for every such offense shall be punishable by fine of not exceeding \$100 or by imprisonment for not exceeding six months, or by both, and the President is authorized to employ the armed forces to prevent any such obstruction.

The bill is proposed as an amendment to the act to regulate commerce. The first four sections provide for the enlargement of the Interstate Commerce Commission to eleven members and authorize the commission to organize itself into divisions for the handling of different branches of its work, each division to have authority to take action which will have the same force and effect as if made by the commission as a whole. The bill would also increase the salary of the secretary of the commission to \$7,500 per annum.

#### STATE DISCRIMINATION AGAINST INTERSTATE COMMERCE AGAIN BEFORE SUPREME COURT

The Supreme Court of the United States listened with considerable apparent amusement last Friday to accounts of how its decision in the Shreveport rate case has been overruled by the Supreme Court of South Dakota in the South Dakota express case. The case came before the Supreme Court on an appeal from an injunction issued by the South Dakota court restraining the American and Wells-Fargo express companies from putting into effect rates in compliance with an order of the Interstate Commerce Commission to remove the discrimination against interstate commerce created by the low rates ordered by the South Dakota railroad commission. In 1911, the South Dakota commission, in accordance with an act of the state legislature, reduced all express rates in the state to a maximum of 70 per cent of the lowest rates then in effect. In 1914, the Interstate Commerce Commission, after its general express investigation, put into effect its order prescribing the zone and block system of express rates for interstate traffic throughout the country.

The Interstate Commerce Commission's basis of rates was subsequently adopted by 42 states, but not by South Dakota, whereupon the Commercial Club of Sioux City, Ia., brought a complaint before the Interstate Commerce Commission to remove the discrimination created by the lower rates enjoyed by South Dakota jobbing points, with which Sioux City competed for business in South Dakota. Although the Interstate Commerce Commission had twice reduced the interstate rates, Sioux City had to pay rates 50 to 150 per cent higher than the South Dakota state rates. The Interstate Com-

merce Commission last year issued an order, which is practically a paraphrase of its order in the Shreveport case, involving the discrimination by the Texas commission against interstate traffic, which order was sustained by the Supreme Court. The commission ordered the express companies to remove the discrimination and found that the South Dakota rates were too low and that the interstate rates were not unreasonable.

The express companies then asked the state commission to allow them to put the Interstate Commerce Commission rates into effect in South Dakota, but the commission refused and set the date for a hearing for a general investigation about five months after the effective date of the Federal commission's order. The express companies then put the Interstate Commerce Commission's rates into effect between the five jobbing points in South Dakota named in the order and other points on their lines in that State. The state commission refused to accept the tariffs and the state Supreme Court enjoined them, announcing that it had no doubt that the Supreme Court would recede from the position it had taken in the Shreveport case when it heard the facts in this case, and holding that the order of the Interstate Commerce Commission, if subject to the construction placed on it by the express companies was void.

After this statement of the case before the Supreme Court on Friday, some of the justices seemed to find difficulty in locating the difference between this case and that already decided. Counsel for the express companies contended that the only difference lay in the fact that they had not complied with the state law requiring them to file their tariffs with the state commission 30 days in advance and to secure the approval of the commission. They had not done so because the commission had told them it would not accept them and the tariffs were filed as soon as they could be prepared, which was 20 days before the effective date of the Interstate Commerce Commission's order. They also argued that the state court had no jurisdiction over the case because jurisdiction in cases to set aside or annul orders of the Interstate Commerce Commission was specifically vested in the United States district courts and that the order of the Interstate Commerce Commission was a valid exercise of its authority under the Shreveport decision.

The state authorities apparently had tried to escape from the Shreveport doctrine by ignoring the Interstate Commerce Commission. The complaint of the state filed in the state court made no mention of the Interstate Commerce Commission's order, simply stating that the express companies had put in rates in violation of the state law and the commission's order; and Assistant Attorney General Sweet, of South Dakota argued before the Supreme Court that the rates put in effect by the express companies were not specifically required by the Interstate Commerce Commission's order; that the state commission had jurisdiction to make intrastate rates, and that the express companies' tariffs had no legal standing. When Chief Justice White asked for his basis for stating that the rates were not required by the Interstate Commerce Commission, he contended that the federal commission had not prescribed any specific rates, but had simply ordered the removal of the discrimination; that its rates were maximum rates and were permissive rather than mandatory, whereas because they were applied only between the five jobbing centers and other points on the express companies' lines and did not apply to the whole state, they created intolerable discriminations as to intrastate traffic.

The chief justice asked if the Interstate Commerce Commission had not said that the discrimination was created by the low state rates and he remarked that "if the state had fixed reasonable rates at the start the trouble would not exist."

Mr. Sweet also argued that the Interstate Commerce Com-

mission, in fixing the general zone scale of express rates, had not considered intrastate conditions and that if it did apply its rates throughout the state it would be acting contrary to the provision in Section 1 of the commerce act excluding the commission from jurisdiction over state traffic. Justice McReynolds asked if he expected the state court to decide which scale of rates was reasonable. To this Mr. Sweet replied that the conflict was not between the state and the Interstate Commerce Commission, but between the state rates and the rates filed by the express companies.

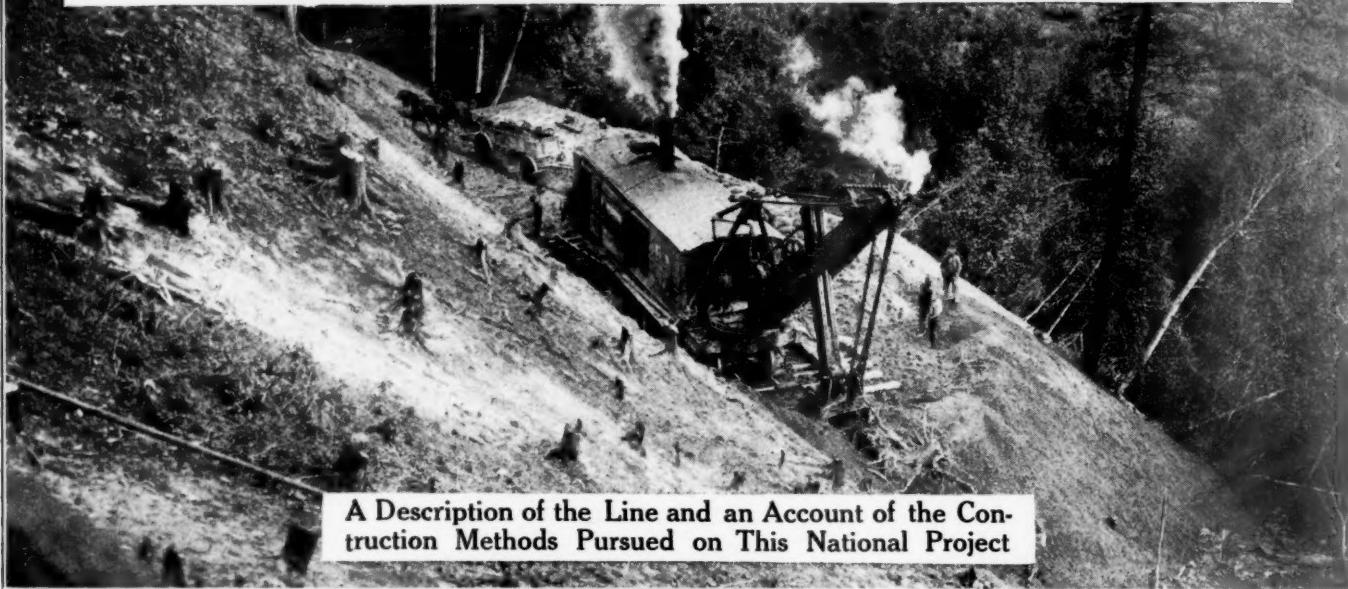
Solicitor Folk of the Interstate Commerce Commission filed a brief in the case in which he said that the express rates were in compliance with the Interstate Commerce Commission's order. "If it is established," he said, "that state courts may issue injunctions against carriers subject to the act to prevent their complying with orders of the commission, where a direct review of these orders is provided in the Federal courts, the efficiency of the commission in administering this law will be seriously crippled. We do not question the ability or fairness of the South Dakota commissioners, although how they reached the conclusion that express rates, which include pick-up and delivery service, should be lower than first class freight rates in many instances for the same distance is not explained. Nor can the ability and fairness of the federal commission in fixing interstate rates for like distances from Sioux City, Ia., to those competitive points be questioned. The rates are substantially different, and the result, as the commission has found, is unjust and unreasonable preference and advantage to the South Dakota cities. This brings about a conflict which calls for the determination of whether the federal or the state authority shall prevail. This question was answered by this court in the Shreveport case. We respectfully submit that the decree of the supreme court of South Dakota should be reversed and that the bill should be dismissed."

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**THE FULL CREW WASTE.**—New York should promptly follow the example of New Jersey and release for needed work the railroad men now employed under the so-called full-crew law. Railroad trains in this state are now overmanned to the amount of fully 2,000 men. According to the most expert opinion these men are not needed. They are on the payroll of the railroads in obedience to law, and for no other reason. Not all organized labor favored these extortions. The demand was confined to that class of labor that claims all rights for its own, and that insists that no others exist. Samuel Gompers embodies that spirit. In the nation's crisis such "rights" should disappear. The manpower of the nation must be utilized to its full extent at the most efficient points.—*Evening Mail*, New York.

**WHERE SOME OF THE MONEY GOES.**—The fee of Pierce Brothers, Augusta attorneys, amounting to approximately \$50,000, in the railroad tax case, which they have just won, is one of the largest in the history of Georgia litigation. The arrangement with the city of Augusta was on a 20 per cent basis; with the county of Richmond, 33 1/3 per cent; with the board of education of Richmond county, 33 1/3, and the arrangement with the state of Georgia is not known. The sum yielded the state is \$40,191; to the city of Augusta, \$108,158; to Richmond county, \$40,628; to the board of education of Richmond county, \$31,622—a total of \$220,601, which has been collected by the attorneys in back taxes. The suit was started a year ago. The interests named recover back taxes since 1908 on certain stocks and bonds owned by the Georgia Railroad and Banking Company, involved in the William Wadley lease of 1881. The case was fought through all the state courts, after which a settlement was finally reached by the contending parties.—*Atlanta Constitution*.

## Progress on Government Railway in Alaska



A Description of the Line and an Account of the Construction Methods Pursued on This National Project

*A Steam Shovel in a Side Hill Cut*

WORK on the 471-mile railway which the United States Government is building in Alaska has been in progress for two years. The 71 miles of existing railway which the government purchased from the Alaska Northern Railway for \$1,150,000 is being rehabilitated and restored to traffic and track has been laid on nearly 73 miles of new line, including 62 miles of the 75-mile connection between the Matanuska coal fields and tide water at Anchorage. In addition clearing and grading has been in progress on about 100 more miles of line, the completion of which during the coming season with a connection with the Alaska Northern will form a continuous main line of some 210 miles in addition to the 38-mile Matanuska branch and work on about 50 miles of the north end of the line. Measured by the present rate of progress the line will be completed between Seward and Fairbanks, the northern terminus in 1920 or 1921. The construction activities have encouraged colonization materially, both in the town sites and on agricultural lands and arrangements are being made for the leasing of the coal lands.

The purpose of this railroad is to connect the navigable streams of interior Alaska with tide water on the Gulf of Alaska, to provide adequate communication with the outside world for the fertile agricultural areas and mine deposits situated in the Yukon basin, which are now isolated for many months of the year because of the closing of the Yukon river to navigation by ice. The completion of the line is also expected to open up agricultural territories and valuable metal and coal deposits along the route which have been undeveloped heretofore because of a lack of transportation.

The route followed by the line now under construction was selected by President Wilson upon the recommendation of the Alaskan Engineering Commission after an extended investigation. As two rail lines built by private capital had already developed two of the best harbors affording entrance into the interior, these studies considered the utilization and incorporation of these lines in the routes investigated.

### THE LOCATION

The location selected starts at Seward on the Kenai peninsula and utilizes for the first 71 miles, the Alaska Northern railway, built as a private venture between 1904 and 1909. Crossing the Kenai mountains, the line again

reaches tide water at the head of Turnagain arm of Cook's inlet, 65 miles from Seward and follows the north shore of this arm in a westerly direction until a turn to the north can be made along the east shore of Knik arm. The line continues within reaching distance of tide water for a distance of 85 miles to Matanuska Junction which is 150 miles from Seward. Advantage has been taken of this situation to establish a second port for the railway on the east side of Knik arm known as Anchorage. Although the use of this port permits a saving of 115 miles in rail travel, the through rail communication to Seward is deemed necessary because the latter is an all-the-year port, whereas Cook's inlet is closed to navigation four or five months of the year. A third port of entry may be secured at any time by the construction of a 12-mile line from the head of Turnagain arm easterly across the narrow isthmus to Passage Canal, an arm of Prince William Sound.

The route of the main line from the head of Knik arm leads to the northwest into the valley of the Susitna river, a stream draining a basin between the Alaska range and the Talkeetna mountains and emptying into Cook's inlet. The location turns northward, following this stream and its tributary, the Chulitna river, to a crossing of the Alaska range at Broad Pass. Descending northward the line follows the course of the Nenana river to its junction with the Tanana in the interior of Alaska. The last named stream is crossed near its junction with the Nenana and the line turns to the northwest to a junction with the Tanana Valley railroad, seven miles from the town of Fairbanks. In addition to this main line, the President's order covered the construction of a 38-mile branch line from Matanuska Junction at the head of Knik arm up the Matanuska river to the coal fields at Chickaloon.

### THE ALASKA NORTHERN RAILWAY

One of the most interesting sections of the entire road is the 65-mile line across the Kenai peninsula, comprising the Alaska Northern railway and involving as it does the solution of some of the most formidable problems encountered in the project. The profile defines two distinct summits. The first is 12 miles from Seward with an elevation of 700 ft. and the second at mile 45 crossing the Kenai mountains at an elevation of nearly 1,100 ft. above sea level. The

northbound grade up the first summit is over two per cent and with curves of 10 and 12 deg. uncompensated the grade is equivalent to at least 2.5 per cent. The southbound grade is 2.1 per cent. Between the two summits the country is undulating with easy grades for most of the distance. The south approach to the Kenai summit is on a 2 per cent grade with fairly good alignment but the grade descending

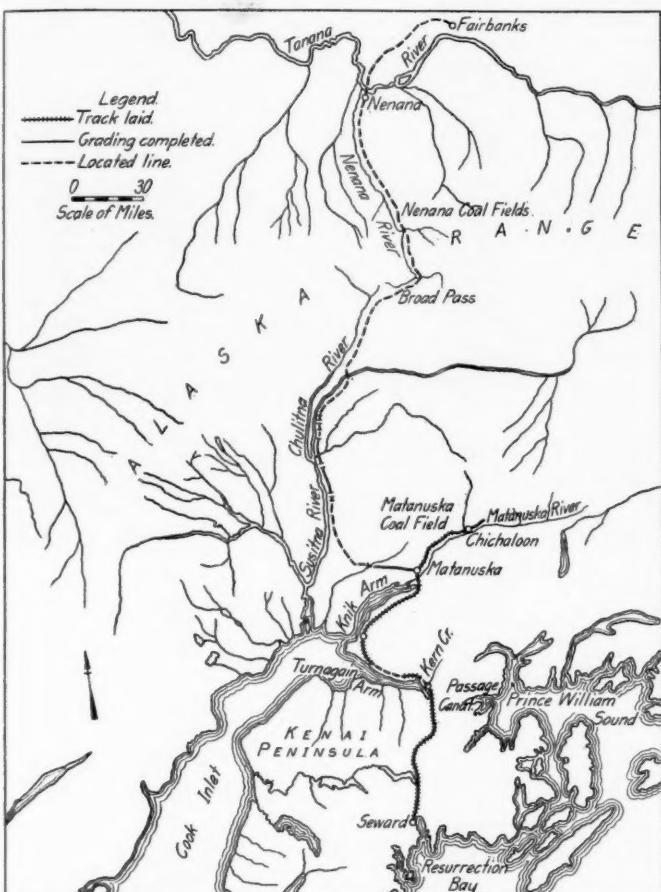
again arm, the line is located in flats of the Placer river, crossing numerous glacier streams carrying large quantities of suspended matter, and which are continually shifting their locations over wide areas as deposits of gravel or silt raise the general level of the flats. This is typical of a large number of Alaskan streams and introduces a serious problem in railway location and maintenance. At the point in question the tracks of the Alaska Northern were not elevated sufficiently above the stream beds and long stretches of the line had been washed out at the time that the Government took possession.

#### TURNAGAIN ARM AND KNIK ARM

The heaviest work encountered on the portion of the line under construction during the last two years is along the north shore of Turnagain arm where the line is benched in steep transverse slopes, with a moderately undulating grade line not exceeding an elevation of 100 ft. above sea level. The shore line is irregular, making it impossible to follow it even with a curvature up to 10 deg. Consequently the construction consists of side hill cuts with fills across the indentations of the shore line. All cuts over four to six feet in depth are in a hard blocky slate with some quartzite. The bridge work is light. The end of the track on the old Alaska Northern is at Kern creek, six miles northwest of the head of Turnagain arm. Beyond this point the work is entirely new and the estimated cost for the 33 miles along the arm is approximately \$77,000 per mile for grading and bridging. This does not include snow sheds which are estimated to cost from \$500,000 to \$700,000 additional. Very little clearing is required in this section.

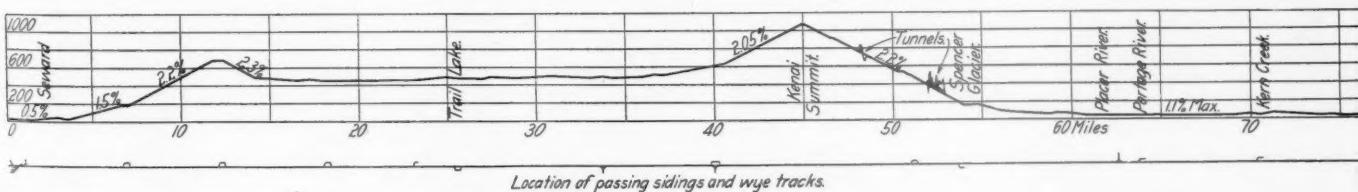
The character of the country along Knik arm is entirely different. Flat rolling slopes covered with a growth of small spruce and birch predominate and it has been possible to supply a large part of the tie requirements from the right of way and adjacent lands. The soil is a gravel covered in many places with moss of a maximum thickness of three feet. Grades and curves are light for the most part and the line is located from three to six miles back from the shore. At the head of Knik arm the line crosses tide flats for a distance of six miles where the Knik and Matanuska rivers enter the bay. The streams are each crossed with three 120-ft. Howe truss spans and considerable stretches of pile trestles. Except for these openings the line is on an embankment for the entire six miles.

The branch to the Matanuska coal fields extends northeast from Matanuska Junction to Chickaloon, a distance of 38½ miles. The latter is at an elevation of 983 ft. above sea level and the line is practically on a water grade along the banks of the river for the entire distance. The maximum grade is one per cent east bound and 0.4 per cent west



Location of the Government Road

northward in the Placer river canyon is on a 2.2 per cent grade in difficult country. Between miles 48 and 51 it was necessary to resort to artificial development in the form of two loops involving high timber trestles, one of which is over 106 ft. high. A number of tunnels were required on this portion of the line and snowslides cause trouble in various places. The improvement of this location is seriously



Profile of the Alaska Northern

hampered by the presence of two glaciers descending into the canyon from the east side, which make it necessary to avoid that side of the canyon entirely. In consequence any plan for improving the north bound descent involves a line carried on a shelf along the west wall of the canyon which would entail very heavy work including numerous tunnels and snow sheds. This improvement is not contemplated at the present time.

From the foot of the present grade to the head of Turn-

bound (with the traffic). The work may be classed as about 40 per cent heavy and 60 per cent light.

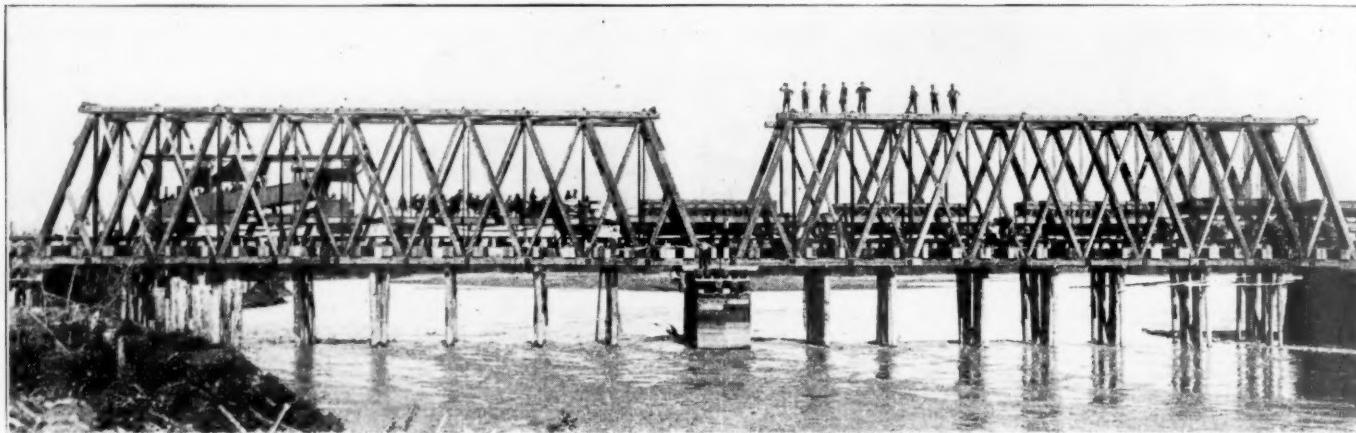
#### FROM KNIK ARM TO FAIRBANKS

For the first 120 miles northwest from Matanuska Junction the country is closely timbered with small spruce that will serve for cross ties, short piling, box culverts, etc. Leaving the head of Knik arm the line makes a climb on a one per cent grade with considerable curvature to about

elevation 325 and, holding approximately to this contour, skirts the foot of Bald mountain into the Susitna valley. Here the grade line is undulating but the alinement is generally easy. The grading is relatively light except where the line crosses the numerous streams flowing westward into the Susitna river. Seventy-five miles out, the line approaches close to the river which it follows north on virtually a water grade. The work becomes heavier and the alinement more irregular.

One hundred and twenty miles from the tide water where

About 24 miles from the pass the line reaches the Nenana river, the general direction of which is then followed for 77 miles to the Tanana river. For 10 miles the line is located through the Nenana canyon, necessitating some quite heavy work and a few short tunnels. The river flows in a deep canyon with a swift current and is a dangerous stream, making railway location and construction difficult. For most of the remaining distance to its junction with the Tanana the country is less difficult, particularly the last 50 miles where the line is located in bottom lands. The Tanana river is to



Typical Howe Truss Spans

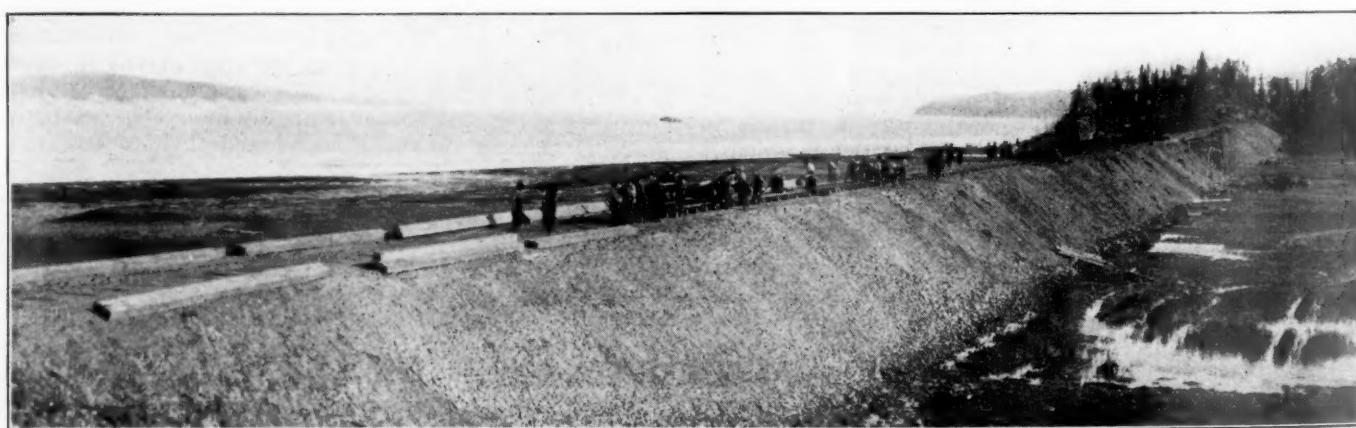
the line, rising with the water grade, has attained an elevation of about 750 ft. it turns up the canyon of Indian river and climbs with a maximum grade of 1.75 per cent about 600 ft. in 11 miles to Chulitna pass, where an elevation of 1,370 ft. is reached.

The line then continues with a maximum grade of 1.75 per cent for a further distance of about 6½ miles to an elevation of 1,690 ft. From this point the line descends on a maximum 2.2 per cent compensated grade for a distance of three miles into the Chulitna river valley to elevation 1,380. The river and its tributaries are followed northward with a maximum ascending grade of 1 per cent compensated to Broad Pass, a distance of 27½ miles. Of this

be crossed by a steel bridge of four spans with trestle approaches of considerable length. To allow for the navigation of the river, one of the spans will need to be movable to give a clearance of 60 ft. above high water. This structure is estimated to cost about \$650,000. From the Tanana river to Fairbanks, a distance of 57 miles, the line follows a location from 12 to 14 miles northwest of the Tanana river on easy grades with light construction work for most of the distance. Little or no rock is encountered.

#### TERMINALS

An important item in the initial work on the road consisted of terminal developments at Seward and Anchorage.



Laying Track on an Embankment South of Anchorage

distance about 5 miles is heavy work, the remainder being mostly embankments from three to five feet in height.

Broad Pass, 167 miles from head of Knik arm, is six to eight miles wide, timbered with scattering spruce and much less rugged than the country to the north and south. The maximum elevation reached is a little more than 2,400 ft. and for some distance the grading is relatively light. This is also true for 25 miles north of Broad Pass.

At the former the old Alaska Northern dock has been replaced by a new one supported on creosoted piles. At Anchorage, which is the main depot for all new construction, an extensive terminal was established. All transfer from ships is by lighters and at the present time no plans have been made for a permanent dock that will overcome the 35- to 45-ft. tidal variation. The development at this place has resulted in the growth of a city which is said to have a

present population of about 5,000 people. Further development at Anchorage and Seward will depend very largely upon the rapidity of the commercial development of the Matanuska coal fields.

#### STANDARDS

Exclusive of the Alaska Northern the ruling gradient in both directions will be one per cent except for a 1.75 per cent north bound grade and the 2.2 per cent south bound grade in the vicinity of Broad Pass previously mentioned.



Eagle River Bridge—Knik Arm Line

The maximum curvature is 10 deg. on the main line with a limited number of 12-deg. curves on the Matanuska coal branch. On the Alaska Northern, reconstruction will reduce existing grades to 2.2 per cent compensated and will reduce the curvature to 10 deg. with the exception of one 14-deg. curve on the loop in the Placer river canyon. Cuts have a base width of 18 to 20 ft. and fills are from 16 to 18 ft. wide on top. The ties are 6 in. by 8 in. by 8 ft. and of native spruce and hemlock. The standard rail is a 70-lb.



Wing Dams on the Matanuska River

A. S. C. E. section of open hearth steel. The Alaska Northern was laid with 65-lb. rail with 15 miles of 56-lb. The latter has been replaced by 70-lb. rail and some 65-lb. rail which the Alaska Northern company had received but never laid. Howe truss bridges are being used for openings up to 120-ft. span. This will take care of most of the bridges required but in the south approach to Broad Pass a number of high steel viaducts will be constructed. The bridges are designed for Cooper's E-30 classification.

#### CONSTRUCTION PROGRESS

The actual construction of the line was started in the spring of 1915 and has continued without interruption to

date except for the temporary cessation of such work as cannot be carried on during the winter months. Work has been prosecuted from several points of which the most important are Seward and Anchorage. The Alaska Northern had virtually suspended operation some time before its purchase by the Government and its physical condition had deteriorated to such an extent that extensive rehabilitation was necessary before operation could be resumed. Because of this and the fact that the work along Turnagain arm is very heavy between the end of the Alaska Northern and the town of Anchorage, it was concluded to complete the line from Anchorage to the Matanuska coal field first. This section promises the earliest source of revenue traffic as well as affording a supply of coal for railroad and marine purposes. This connection has been nearly completed and while the repair of the Alaska Northern has been finished to a sufficient extent to permit of operation of light trains, work on only 15 miles of the 45 miles between Anchorage and Kern creek has been finished, although rapid progress is being made on all of this section of the line.

From the head of Knik arm, grading has been completed for about 25 miles out on the main line. Some work has also been done in the Susitna valley, where supplies could be



Grading in Timbered Country

sent in by boats plying on the Susitna river. Clearing is also in progress between this point and Matanuska Junction and during the coming season it is expected to complete the line to Indian river, 156 miles from Anchorage.

On the other end of the line where access can be had via the Yukon, 100 miles of clearing and 7 or 8 miles of grading have been completed. Thirty miles of rail were sent in via St. Michael in 1916.

The transportation of supplies and equipment is the most formidable problem encountered. Work has been prosecuted first on those portions of the line tributary to water transportation. As the crossing over Broad Pass is isolated it will obviously be finished last. Because of the soft road conditions in Summer it is necessary to conduct most of the transportation overland during the Winter when the ground is frozen. In addition to this the Winter activities consist of clearing and rock excavation.

#### CONSTRUCTION METHODS

All grading is done by station men. The ballasting, hauling of material and rail laying is done by men in the direct employ of the commission at an hourly wage rate. The men are principally Russians, Italians and Swedes, the latter working principally on rock excavation. A few Americans are employed but the resident white Alaskans as a rule do not

take to the construction work. The eight hour day is in force for all men working at a daily rate.

The station work as carried out has been very successful, a carefully prepared contract having been drawn up to cover the details of the agreement. This is signed by each man of each co-partnership engaged in the work and each man receives a separate check for his portion of the payment. The rates on excavation are 75 to 90 cents per cu. yd. for solid rock, 40 to 45 cents for loose rock and 30 to 40 cents for common excavation. For overhaul in excess of 400 ft.  $1\frac{1}{2}$  cents per cu. yd. per 100 ft. is paid. In 1915 the average earnings of station men on 41 contracts, after deducting the cost of tools, explosives, team and equipment hire and wages for laborers employed, was 41 cents per hour per man.

Clearing costs \$30 to \$75 per acre, piling and hewn culvert timbers 10 to 15 cents per foot and ties 35 to 37 cents each. Lumber for bridges and buildings is imported from Puget Sound and costs an average of \$18.50 per 1,000 ft. b.m. delivered at Anchorage.

The use of heavy excavating machinery is precluded by the difficulty of transportation. In consequence the equipment used in the grading work has consisted for the most part of dump cars pushed by hand. No team work has been done thus far but it is hoped that teams and scrapers can be used on some of the Tanana river work. Dump cars and other equipment is furnished to the station men at an established rental. A number of large dump cars, three or four steam shovels and some flat cars were shipped to Alaska from the Panama canal. The shovels are used in ballast service. Several locomotive cranes were purchased which have proven valuable in handling material. The commission maintains a commissary department to supply employees and station men with all kinds of living and working supplies which are sold at reasonable rates, although the men are not required to patronize this commissary. At Anchorage an amusement hall, or club room, is provided for recreation purposes and the commission has erected cottages which are rented to men with families.

All work on the Government railway in Alaska, including the investigation of routes and location of the line is under the direction of the Alaska Engineering Commission appointed in 1914 by President Wilson. This commission consists of William C. Edes, chairman, Frederick Mears and Thomas Riggs, Jr.

#### PROPOSED LEGISLATION AFFECTING RAILWAYS

The following bills, in addition to those mentioned last week, have been introduced in Congress during the extra session.

H. R. 1662, by Mr. Sterling, of Illinois, April 4, 1917. To Committee on Interstate and Foreign Commerce. To increase salary of chief inspector, bureau of locomotive boiler inspection, to \$5,000 per year, and assistant chief inspectors to \$4,000 per year each. A similar bill was introduced during sixty-fourth Congress, but it failed to pass.

H. R. 1704, by Mr. Taylor, of Colorado, April 4, 1917. To Committee on Interstate and Foreign Commerce. To require common carriers engaged in interstate commerce to equip all locomotives used in interstate traffic in transportation of trains with headlights of not less than 1500 candle-power and to provide a penalty for the violation of the same, etc.

H. R. 1707, by Mr. Taylor, of Colorado, April 4, 1917. To Committee on Judiciary. Prohibiting senators, representatives and delegates in Congress from receiving compensation or acting as counsel in certain matters where the United States is interested, or for parties or corporations

H. R. 1710, by Mr. Taylor, April 4, 1917. To Committee on Interstate and Foreign Commerce.

tee on Interstate and Foreign Commerce. To enable interstate carriers to issue transportation to publishers of newspapers and periodicals in payment for advertisements. Similar bills were introduced in at least three previous Congresses, but made no headway.

S. 126, by Senator Townsend, April 4, 1917. To Committee on Interstate Commerce. To provide for investigation of controversies affecting interstate commerce, etc. President of United States may appoint a special commission, not to exceed seven in number, to conduct investigation of controversies between carriers and their employees. Commissioner of labor statistics shall be ex-officio secretary of the commission. Commission to report to President, setting forth all facts and causes, together with recommendations, and President shall transmit same to Congress with such comments and recommendations as he may see fit to make.

S. 286, by Senator McKellar, April 4, 1917. To Committee on Interstate Commerce. To prohibit interstate shipment, sale of, traffic in, and dealing in certain cold-storage food products.

S. 288, by Senator McKellar, April 4, 1917. To Committee on Interstate Commerce. Regulating shipments of freight to foreign ports and prohibiting discrimination in the receipt and shipment of such freight.

S. 313, by Senator Poindexter, April 4, 1917. To Committee on Interstate Commerce. Making it unlawful for interstate carriers to charge or receive any greater compensation in the aggregate for the transportation of passengers, or of like kind of property, for a shorter than for a long distance over the same line or route in the same direction, the shorter being included within the longer distance, or to charge any greater compensation as a through rate than the aggregate of the intermediate rates subject to the provisions of the act to regulate commerce. Not to be construed as authorizing any common carrier within the terms of the act to regulate commerce to charge or receive as great compensation for a shorter as for a longer distance. Whenever a carrier by railroad shall, in competition with a water route or routes, reduce the rates on the carriage of any species of freight to or from competitive points, it shall not increase such rates unless after hearing and an order granting permission therefor by the Interstate Commerce Commission. A similar bill was introduced during the last Congress, but no action was had thereon.

S. 314, by Senator Poindexter, April 4, 1917. To Committee on Interstate Commerce. To amend section 20 of the act to regulate commerce, to prevent overissues of securities by carriers, etc. Similar bill was introduced during the last Congress, but no action was had thereon.

S. 383, by Senator Culberson, April 4, 1917. To Committee on Judiciary. To punish the destruction or injuring of war material and war transportation facilities by fire, explosives, or other violent means, and to prohibit hostile use of property during time of war, etc. The Senate on April 9, 1917, passed this bill.

S. 633, by Senator Pomerene, April 4, 1917. To Committee on Interstate Commerce. To strike from the bills of lading law passed during the first session of the Sixty-fourth Congress the provision permitting agents of carriers to accept shippers' load and count and insert same in waybills.

S. 636, by Senator Pomerene, April 4, 1917. To Committee on Interstate Commerce. Conferring on the Interstate Commerce Commission authority and power over the exchange, interchange and return of cars engaged in interstate commerce. Similar bills were introduced in both branches of Congress during the session which adjourned March 4, 1917, and a bill by Representative Esch was reported to the House from the Committee on Interstate and Foreign Commerce, but it failed of passage.

S. 779, by Senator Robinson, April 6, 1917. To Committee on Interstate Commerce. To increase the membership of the Interstate Commerce Commission to nine, and to authorize the commissioners to divide its work. Several similar bills were introduced during the last Congress, but did not become law.

S. 914, by Senator Myers, April 6, 1917. To Committee on Interstate Commerce. To amend the acts to regulate commerce so as to provide that publishers of newspapers may enter into the advertising contracts with common carriers and receive payment for such advertisements in transportation.

S. 780, by Senator Robinson, April 6, 1917. To Committee on Interstate Commerce. To amend section 3 of the act relating to the liability of common carriers by railroad to their employees in certain cases. In all accidents hereafter brought against common carriers by railroad under or by virtue of any of the provisions of this act to recover damages for personal injuries to an employee, or where such injuries have resulted in his death, the fact that the employee may have been guilty of contributory negligence, shall not bar a recovery, but damage, however, may be diminished by jury in proportion to amount of negligence attributable to such employee. No such employee who may be killed or injured shall be held to have been guilty of contributory negligence in any case where the violation by such common carrier of any state or federal statute enacted for the safety of employees contributed to the injury or death of such employee. Employee shall not be held to have assumed the risks of his employment.

H. R. 2319, by Mr. Hamlin, April 9, 1917. To Committee on Interstate and Foreign Commerce. To provide an elective remedy and compensation for accidental injuries, resulting in disability or death, to employees of common carriers by railroads engaged in interstate or foreign commerce or in the District of Columbia or the territories of the United States, and for other purposes.

H. R. 2329, by Mr. Rayburn, April 9, 1917. To Committee on Interstate and Foreign Commerce. To amend the act to regulate commerce, to give the Interstate Commerce Commission authority and power over the issuance of railway securities.

S. 1471, by Senator Shafroth, April 9, 1917. To Committee on Interstate Commerce. Provides that it shall be unlawful for any common carrier to charge or receive any greater compensation in the aggregate for transportation for a shorter than for a longer distance over the same line or route in the same direction (the shorter being included within the longer distance) or to charge any greater compensation as a through route than the aggregate of the intermediate rates for like freight.

S. 1472, by Senator Shafroth, April 9, 1917. To Committee on Interstate Commerce. Omnibus safety appliance bill. To give Interstate Commerce Commission authority to compel installation of block signals, automatic train control, steel cars, headlights, uniform signals, roadbed, etc.

H. R. 2785, by Mr. Hayes, April 11, 1917. To Committee on Interstate and Foreign Commerce. To provide for the issuance of free transportation in exchange for advertising.

S. 1593, by Senator Ransdell, April 11, 1917. To Committee on Interstate Commerce. Compelling common carriers engaged in interstate commerce to equip their cars with automatic adjustable fire extinguishers of not less than 25 gallons capacity.

S. 1623, by Senator Cummins, April 11, 1917. To Committee on Interstate Commerce. To prohibit charging a higher rate over the same line and in the same direction of any article grown or manufactured in the United States than for a like article or commodity when imported into the United States from a foreign country, and to provide that the

inland proportion of through import rates shall be held to be the rate or charge made and received for the transportation thereof in this country. Carriers conforming to the foregoing provision shall not increase any rate without approval of Interstate Commerce Commission, after full hearing, etc.

S. 1624, by Senator Cummins, April 11, 1917. To Committee on Interstate Commerce. To increase salary of chief inspector of locomotive boilers to \$5,000 and assistant chiefs to \$4,000 per annum.

S. 1594, by Senator Ransdell, April 11, 1917. To Committee on Interstate Commerce. To empower the Interstate Commerce Commission to fix minimum as well as maximum rates.

S. 1759, by Senator Underwood, April 12, 1917. To Committee on Interstate Commerce. To give the Interstate Commerce Commission the power to fix the hours of labor and determine wages for employees of carriers engaged in interstate and foreign commerce.

The provisions of the Adamson bill to authorize the President to take over railroads, telegraph and telephone lines, H. R. 2901, are given elsewhere. The bill was referred to the Committee on Interstate and Foreign Commerce which has not yet been organized. It is still doubted whether any general legislation will be passed at the extra session of Congress, after the war measures and appropriation bills have been passed.

## A CAMPAIGN TO INCREASE CAR LOADING

In an endeavor to enlist the co-operation of shippers in the heavier loading of cars the Pennsylvania Railroad is issuing a series of bulletins calling attention to the possi-


**MAKE ONE CAR DO THE WORK OF TWO**  
**Load Cars to Full Capacity**  
**REDUCE ACCUMULATION  
QUICKEN MOVEMENT**  
**PLEASE PATRONS**  
**MAKE MORE BUSINESS**

**THE PENNSYLVANIA RAILROAD COMPANY**  
THE PHILADELPHIA, BALTIMORE & WASHINGTON RAILROAD COMPANY  
WEST JERSEY & SEASHORE RAILROAD COMPANY  
OFFICE OF SUPERINTENDENT STATIONS AND TRANSFERS

Philadelphia, December 1, 1916.

**CAR UTILITY BULLETIN No. 2**

Thousands of cars are to-day moving over this Railroad with only half a load. At the same time, hundreds of Shippers and Consignees are being hampered in their business because the Railroad is unable to furnish sufficient empty cars to meet their needs.  
 One of the reasons for car shortage is that car space is not being used as efficiently as it should be.  
 The Railroad is doing all in its power to remedy this situation. To make the effort successful, it needs the full co-operation of its patrons.  
 Here is one thing that can be done.  
**WHENEVER POSSIBLE, INCREASE THE SIZE OF EACH INDIVIDUAL SHIPMENT, OR COMMERCIAL UNIT, TO A FULL CARLOAD. FOR INSTANCE—**  
 Many barrelled commodities are shipped in 100-barrel lots. But the standard 40-foot box car will hold from 150 to 300 barrels. Why not make each lot what the car will hold?  
**SHIPPIERS CAN HELP**  
 By ordering only such cars as are needed for immediate loading.  
 By basing their orders for cars upon the full capacity of the car, which is 10 per cent. above the marked capacity.  
 By loading cars as soon as they are placed and not take advantage of the 48 hours free time allowed under the car demurrage rules.  
 By giving the Agent billing instructions in advance so that the car can be moved as soon as it is loaded.  
**CONSIGNEES CAN HELP**  
 By increasing the size of their orders for goods to the carrying or cubic capacity of cars, instead of ordering goods on the minimum carload basis, which in many instances is only half a carload.  
 By arranging in advance for men and teams to unload cars as soon as placed and not take advantage of the 48 hours free time allowed under the car demurrage rules.  
 By avoiding the use of cars for storage purposes.  
 By instructing their teamsters to finish the unloading of a car at the end of the day when only a small portion of the load remains in the car.  
 By giving prompt notice to Agents when cars have been unloaded.  
**AGENTS WILL CAREFULLY SUPERVISE THE LOADING OF CARS AND WHENEVER POSSIBLE WILL COMBINE CARLOAD SHIPMENTS WHICH ARE DESTINED TO ONE POINT OF DESTINATION. PROPER CARE MUST BE EXERCISED IN THE LOADING, SO THAT THE IDENTITY OF EACH SHIPMENT IS PRESERVED.**

**WILL YOU HELP?**

APPROVED:  
 C. M. SHEAFFER,  
General Superintendent Transportation.

H. C. BIXLER,  
Superintendent Stations and Transfers.

## A Typical Bulletin

bilities of improvement in this respect. These bulletins are distributed to all station agents and their employees concerned in the handling of freight and to all shippers, con-

signees, brokers, buyers, boards of trade, chambers of commerce and other commercial organizations and to trade journals and newspapers. In many cases they are delivered to shippers personally by station agents, this personal contact between employees and patrons being an important factor in the results which are being secured. The slogans "make one car do the work of two" and "load cars to full capacity," appear prominently on a colored sticker attached to correspondence and on the bulletins. As an illustration of the character of the bulletins which are being issued, one dated March 24 calls attention to the fact that 550 cases of canned goods weighing slightly over 36,000 lbs. are commonly considered a carload, although 800 cases can be loaded in a 60,000-lb. capacity car. These bulletins appeal to packers and jobbers to utilize the full loading capacity of cars and thus aid in conserving equipment, relieving car shortage and hastening car movements.

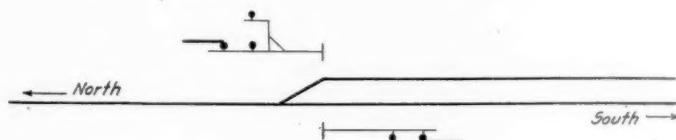
#### AUTOMATIC BLOCK SIGNALS ON THE MONON

The Chicago, Indianapolis & Louisville now has automatic block signals on its main line from Chicago south to Orleans, Ind., 260 miles; the last 40 miles, from Bloomington, Ind., having been installed during the summer of last year. This 40-mile section traverses the Bedford stone district, and there are in the 40 miles 93 curves, aggregating in length a fraction over 50 per cent of the total. Approaching Bedford there are grades of 1½ per cent.

The location of the signals required much detail study. With double locations this required the consideration of trains approaching from both directions, and sometimes the presence of a curve or a grade would require the favoring of trains from one direction over the other; and for the sake of economy, locations were selected which would not require much blasting. After all the locations were staked out an

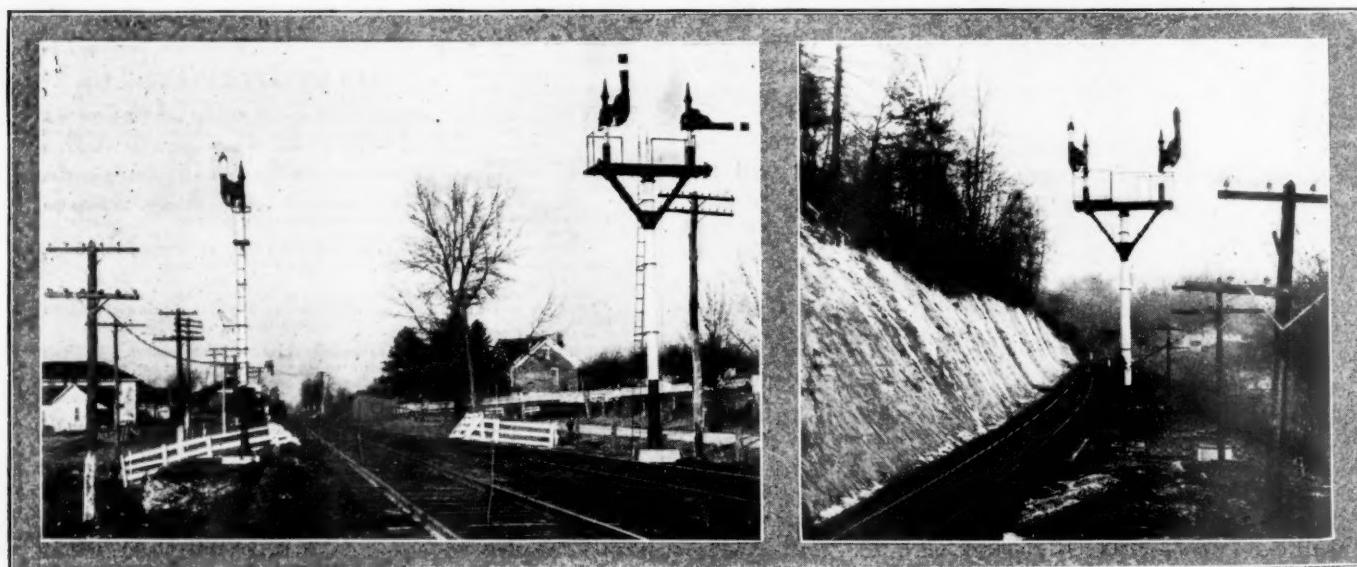
grade, but for down-grade movements an overlap is used in addition to the regular circuit.

There are no interlocking plants on this piece of road. Some points, however, called for special signaling. The sidings at Guthrie, Logan and Yockey being very short, and so situated as not to be often used as meeting points, only one set of signals was installed for each siding instead of having signals at each end. For example, at Logan, the signals are at the north end of the siding, and are arranged as in the sketch below. The signal for northbound trains is set back at the fouling point (opposite the southbound signal) so that a southbound train can approach and enter the siding without disturbing a northbound train standing on the main track. Each of these signals is equipped with a red square ended blade and a marker light, the lights being arranged vertically.



The trainmen understand that they can have a train on the main track facing such a signal and that the opposing train can approach without being blocked. There is one of these signals at the leaving end of each fully signaled siding, which are commonly spoken of as starting signals. Trains using any short siding which is equipped with only one set of signals must back out of the siding and in this manner receive a signal indication for proceeding.

Where switch indicators are used at plain turnouts such as a spur track or the beginning of a siding the indicators are placed approximately 4 ft. from the switch stand, but if a crossover in a long siding requires a set of indicators then the indicators are placed at the switch on the side track end



Signals at a Junction

Bracket Signal at Intermediate Location

inspection party was taken over the line and a few of the locations were changed, principally at the suggestion of the road foreman of engines, who pointed out places where heavy trains could be more easily started if stopped.

This road has had 100 miles of "A. P. B." automatic block signals in operation since 1912, which has given ample opportunity to observe the advantages of the system; and it was decided to use this system for the new installation. On that portion of the line where the grade is excessive, the regular A. P. B. circuit is used for following movements up

of the crossover, as this is the first switch opened when a train leaves a siding by means of the crossover. Both ends of the crossover to the main track are connected by means of switch boxes to the signal system, thus requiring the side track switch as well as the main track switch to be kept in the normal position except when the crossover is being used.

**THIS APPLIES TO TRESPASSERS ON RAILWAY PROPERTY.—** When that sentry tells you to halt, halt. You are at the wrong end of the gun.—*The Wall Street Journal.*

# Selling Securities Direct to the Public

European Railways and Governments Secure Results  
with Bonds of Small Denominations and by Advertising

By Our Special European Correspondent

**I**N an article, "The French Railroads as Security Brokers," published in the *Railway Age Gazette* of October 1, 1915, I emphasized that the outside world had underestimated the enduring power of accumulated wealth, as against the power of war to destroy such wealth and impoverish the nations at war. In the same article, attention was called to the manner in which the French railways sell their stocks and bonds themselves, over the counter, so to speak, right in their own stations, without recourse to bankers. The article said that even in war-time they were continuing to sell their securities in this way. It told how such re-investment by the saving public was helping to tide over war time financial difficulties, and how such investments by small holders tended to improve relations between the railroads and the public. The French people are still buying and

money have been obtained in England, in France, in Italy, in Germany, in Austria, by national loans or bond issues to carry on the war.

It is beyond argument that the American railroads need public attention to their welfare. They also need money. In one of the last public addresses of the late James J. Hill, he said: "For years to come credit will be stretched to the breaking point, and capital in greater demand than it has been within the memory of living man. Before the war became imminent, a drop in the market prices of French, German and English government securities had reflected the rising rates of interest. One railroad company in this country recently put out an issue of short time notes on terms that made the cost of the loan to the company over seven per cent." He also said: "One obstacle to obtaining sufficient



Photograph from Underwood & Underwood, N. Y.

All London Rallied at Trafalgar Square in Great "War-Loan" Gathering

storing away these railroad securities even though parts of these railways are at present held by the enemy, or are used by the military. There is a big lesson for American railroads to learn from the selling methods used by the French railways.

The American government, having now come out on the side of humanity and justice, is about to enter this world conflict. Perhaps it can also learn a great deal from the similar but more extensive methods used by the European governments. If the American government wants to get the best results in bringing about the investment of the public's savings in its contemplated mammoth bond issues, let it also study the methods by which unbelievable sums of

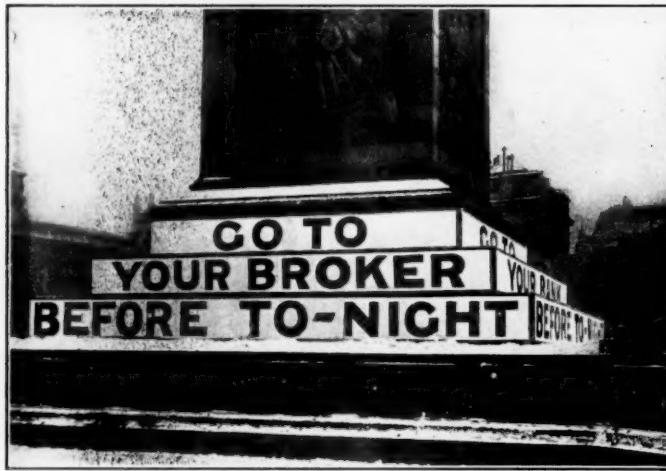
capital to carry on our enterprises is the world-wide rise of interest rates. Norway is a country at peace, and likely to remain so. Its people are industrious and frugal, and its credit deservedly high. Yet Norway has just paid six per cent on a loan for two and three years. What rate will Europe have to pay when it comes to capitalize the destruction wrought by this war, and then to add the cost of reconstructing its industrial plants after peace has been declared?"

The advertising machinery used by the various governments at war to secure investments of small sums by a large majority of their citizens in these various national loans has been one of the most interesting phases of the whole war. I

do not believe that there has yet been printed a study of the means used to secure money from people by this means. The results have surprised most of the various financiers who organized the advertising machinery. While the keynote of these various advertising campaigns has been that persons possessing sums from \$20 upward should invest in the loans or bonds as a patriotic duty, I think the majority of the investments have been made because the buyers were convinced that they were investing their money well.

When the first loans were launched in France, I remember that they were put out in a perfunctory way, as before the war, with the result that only the comparatively wealthy people subscribed. Then, somebody said: "This is all very well, but there are thousands of people with money who don't know quite how to buy these bonds." So on the second loan the billboards were plastered with detailed information as to how subscriptions might be made. These notices were likewise posted up in all the railway stations. Advertisements were inserted in the newspapers as well, explaining that the interest paid was 5 per cent, an interest rate which is still attractive in these countries of Europe where before the war the rate of interest was  $2\frac{1}{2}$  to 3 per cent. While France has been fighting for its very life, while there has, of course, been much poverty on all sides, the capital secured at home by the French government to date in its various loans has been, roundly speaking, two billion dollars, a sum which represents about the total of all American loans to all foreign governments since the war began.

What is just as surprising is that, always through its shrewd forms of advertising, the French people have been induced to exchange their hidden gold—gold money that has been treasured up for the past half century, sums that astound. During the year 1916, 160 million francs in gold



A "Close-Up" of the Nelson Monument

(roundly 30 million dollars) were passed into the coffers of the Bank of France.

In Italy, which is not nearly as rich as France, the advertisements have met with the same comparative success. A financier told me just before the launching of the third home loan, early in 1916, that the government hoped to obtain about 2 billion lire. As a matter of fact, it obtained more than 4 billion lire, or nearly a billion dollars.

I am sure the success of these money campaigns has been largely due to the placing of the loans within reach of ordinary, plain, common people who, as a rule, know of no other form of investment than that of the savings bank, and who take a pride in being able to say they own a bond.

While in France the people of moderate means have for many, many years known how to make such investments,

there were many thousands of others who were positively afraid to go near a bank and who if they went, in the old days, would not have been sold a single bond for \$20, as the government has done with these loans. In other words, these governments have educated their great mass of citizens, have shown them how to buy; and in doing so they have not gotten their money without giving value received. Many Americans abroad have invested in these government loans and consider they are doing well thereby.

The American public needs educating in the same way. Certainly the American railroad securities are good investments and many thousands of people of small property would invest in them if the way were made easy. At present, the way is easy only for the experienced business man



**UNITED STATES GOVERNMENT  
LOAN**

The ★★★★★★ Co. intends  
to receive and forward subscriptions for  
**UNITED STATES GOVERNMENT  
WAR BONDS**

**without compensation for its service**

*Details will be furnished as soon as obtainable*

A Company with Retail Stores in Cities Throughout the Country Has Posted Signs Like This in Its Windows. It Has Been Suggested That Railways Might Adopt the Same Idea.

who has banking or brokerage connections, or for the speculators in margins on the various city stock exchanges. The writer has personally known a number of small investors who wanted to buy a few shares of railroad stocks or bonds, but who never got to the point of making the purchase simply because the way had not been made easy.

The stations of the American railroads afford splendid opportunities for reaching the public, for posting bills, just in the same measure as the French railroads. All that is needed is the courage of some big railroad to begin the French plan of offering its stocks or bonds to the people riding in its cars.

Have we less courage than the French? While the French have shown themselves wonderful bankers during this war and while they consider us still more wonderful people, must we admit the truth that they are more clever than we in such matters?

Before the war, it was easier to buy in France a single stock or bond of any standard American railroad than in New York, or Chicago, or Louisville or St. Louis. This

was due to the fact that in a great number of French towns bankers had signs hung up inside or outside their offices: "American railroad securities to sell."

It seems never to have occurred to any of us that the immigrant workers, the Italians, say, who used to ship back home so many millions of our cash, as the result of their savings among us, might just as well have been induced to send home our railroad securities.

It is patent that we have bought back from Europe since the war some 500 millions in railroad securities and that we have got to do something to find buyers, for new securities. Shall the railroads try themselves to find the buyers?

### SHIPPERS DIVIDE ON RATE ADVANCES

A meeting of representatives of shippers' organizations took place at the LaSalle hotel, Chicago, on April 13. Although the call for the meeting sent out on March 30, specifically stated that the conference was to be held for the purpose of "considering and determining what course of action should be taken on behalf of and for the protection of the shipping public" in regard to the freight advances proposed by the carriers, the self-styled "committee on credentials" attempted to limit participation in the conference to those who entertained their own views. All wishing to gain admission were asked to sign the following declaration:

"I, the undersigned, have been properly accredited as a representative to the conference of representative organizations of shippers in accordance with the call dated March 30, 1917, and subscribe to the fact that the burden of proof is upon the railroads to justify any general advance in freight rates and that the public is entitled to a full investigation thereof by the Interstate Commerce Commission."

Many of those who responded to the call for a conference were of the opinion that an emergency exists which precludes long drawn out hearings on the proposed rate increases which would be necessitated by a "full investigation" by the Interstate Commerce Commission. After vigorous protests against the requirement that this card be signed had been made by John M. Glenn, secretary of the Illinois Manufacturers' Association, R. D. Sangster, transportation commissioner of the Commercial Club of Kansas City, Mo., and H. G. Wilson, traffic commissioner of the Toledo Commerce Club, those who refused to commit themselves to favoring a full investigation were permitted to participate in the meeting.

A heated discussion followed on the merits of the carriers' contention that an emergency exists which demands prompt and quick investigation of their needs for additional revenue. A suggestion of one of the speakers that pressure by the administration would influence the Interstate Commerce Commission to satisfy the demands of the railroads brought Henry C. Barlow, traffic director of the Chicago Association of Commerce, to the floor in warm defense of the impartiality and fairness of the commission. Mr. Barlow stated that although he had spent most of his recent life in fighting rate advances, he did not favor making war on the railroads at the present time. He stated that the country is facing a crisis and that the present facilities of the railroads are inadequate to meet the demands of the traffic offered them. What the shippers want is service. To get it they must pay for it. He admitted the statement of a previous speaker that the net earnings of the railroads for the year ending June 30, 1916, were the largest in history, but he said that the country is interested in the present and not the past, and that an examination of statements of railroad earnings for the last few months indicated that vastly increased operating expenses are fast reducing the net returns.

As examples of the additional burdens the railways would be forced to bear in the coming year, Mr. Barlow pointed to

the Adamson law as meaning an increased expense of \$65,000,000 and to an advance of 80 cents a ton in the price of coal to be contracted for during the ensuing year. He stated that the railroads have been at a disadvantage in borrowing money during the last year and that their borrowings had actually fallen 20 per cent below previous years because of excessive rates of interest. He voiced his opposition to any action on the part of those assembled calculated to hamper the Interstate Commerce Commission in determining the extent of inquiry into the merits of the representations of the railroads or to prescribe the mode of procedure to be pursued by that body. He stated that he voiced not only his own sentiments but those of the executive committee of the National Industrial Traffic League, of which he was a member, and which has recommended the adoption by the league of the following resolution:

"Resolved, That this question should be submitted to the determination of the Interstate Commerce Commission and that such temporary increase in transportation charges be granted the carriers as a prompt investigation on the part of the commission may disclose their present necessities in the several territories justify. The committee is of the opinion that an increase in interstate rates without a corresponding increase in intrastate rates will place an undue burden upon interstate commerce as well as cause unjust discrimination against communities."

Joseph H. Beck, traffic director of the St. Paul (Minn.) Association of Commerce, denied that the carriers asked for advances in freight rates without any investigation whatever, but stated that they merely asked for such speedy and expeditious inquiry as suited the existing emergency. What confronts the country now is a condition and not a theory. The common carriers, he stated, have absolutely broken down in the last six months because they lack adequate equipment and adequate facilities to handle the traffic offered them. Either the shippers must make needed improvements and betterments possible or pay the frightful cost of inadequate service. A few years ago the railroads had thousands of cars rusting on the tracks, for which they were severely criticised by a hostile public and an antagonistic press. Box cars that cost \$700 then now cost \$1,900, and locomotives which could be had for \$26,000 then now sell at \$50,000. Those who criticised the railroads then for a surplus of equipment now criticise them for insufficient equipment. He stated that every other business had found it necessary to increase the price of its commodities because of increased expenses. The railroads alone have the price of their product arbitrarily determined and alone are powerless to raise that price as the efficient and satisfactory operation of their lines demands.

Clifford Thorne, attorney for certain shippers' organizations, voiced his opposition to the granting of any advances until a full hearing had been held. He stated that it was improper for the railroads to pay for betterments out of earnings and that they should rather borrow capital for that purpose. He stated that the railroads earned \$200,000,000 more in the fiscal year 1916 than in any previous year and that this amount would be ample to pay the interest on all they needed to borrow to provide adequate facilities for moving the traffic of the country.

The accusation was made by one of the speakers following Mr. Thorne that those shippers who favored an advance in rates were able to pass on to the public the increased cost of transportation. Martin VanPersyn, representing the Wholesale Grocers' Association of Chicago, entered a denial, stating that sales had already been made for delivery next fall and that wholesale grocers would be unable to pass on the increases in rates under which that business would move. He stated that the railroads are not able to improve the facilities under present financial conditions and that a crisis

exists which requires that the Interstate Commerce Commission be given a free hand in dealing with the situation.

Although Mr. Barlow submitted a resolution similar to that prepared by the executive committee of the Industrial Traffic League as a substitute for a resolution prepared by the committee on resolutions of the meeting, the substitute was laid on the table by a vote of 110 to 37. The resolution which was passed demands a full investigation by the Interstate Commerce Commission and reads, in part, as follows:

"The chief justification alleged for the proposed increases (in freight rates) is the operation of the Adamson law and the related wage advances. But the main intent of the act is to reduce the working hours to eight per day, and it has been asserted that this can be effected by increased efficiency, without any material advance in wage expenditures.

"However, estimates of wage advances on this account vary from \$20,000,000 to \$100,000,000 annually; increased cost of coal and other supplies are also the subjects of conflicting estimates. But the increases in net revenues in 1916 and 1915 have been ample to absorb those increased costs and still leave returns greater than ever before.

"Whatever of justification there may be for increased rates, if any, can only be determined by an investigation of the facts.

"While other people are called upon to sacrifice their lives, while other industries are content to declare to the people and to the government that they will accept prices for their products and services approximating those of former years, and while still other industries have announced their intention of furnishing their products and services without any profit whatsoever, this attempt of American railroads to obtain for their stockholders an enormous increase in the earnings they have received, seeks to impose for their private benefit a tax of almost \$1,000,000 a day upon the people at large in addition to heavy burdens of taxation which we will have to bear directly because of the war.

*"Therefore, Be It Resolved,* That a full and adequate investigation, as contemplated by law, should be made as to the alleged financial needs of the carriers and as to the reasonableness of the proposed rates before any conclusion is reached or order made by the Interstate Commerce Commission upon the proposed advances."

The meeting was controlled by western granger organizations, aided by several oil shippers' associations. It was significant that the manufacturing interests which have had occasion to cope with the same increases in expenses which are confronting the railroads recognized the need of giving assistance to the carriers at the present time. When it became evident that all action subsequent to the passage of the aforementioned resolution would take place according to a pre-arranged plan by those in control of the meeting, the minority under the leadership of H. G. Wilson bolted the meeting.

Following the passage of the first resolution by those representatives of shippers' organizations who remained in the meeting, a permanent organization was formed under the name of the Shippers' National Conference for the purpose of preparing and introducing evidence before the Interstate Commerce Commission in opposition to the proposed rate increases. On April 14 a telegram was sent to George B. McGinty, secretary of the Interstate Commerce Commission, asking for a personal conference with the commission some time this week. In a letter sent to Mr. McGinty on April 15, supplementing the telegram the statement was made that the new organization represented a combined membership of more than one million shippers who desired a personal conference with the commission before any conclusions as to the plan of procedure in the rate case were arrived at. The letter also included the specific request for a bona fide

genuine hearing of the merits of the case. In a telegram to the Shippers' National Conference on April 16, Mr. McGinty stated that the commission would grant the new organization an informal hearing to take place at Washington on April 20, and to be confined to the plan or method of procedure and character of investigation which should be had in respect to the proposed general increases.

#### "WAGONETTE" LUNCH SERVICE

In order to cater to the wants of passengers in coaches and tourist cars who may not desire a meal in the dining car the Southern Pacific some time ago inaugurated a cabinet lunch, installing coffee and hot water urns, a small refrigerator, a sink, etc., in a section of one of the coaches. To further extend this service it recently established a "wagonette" service. The wagonette is a small, light vehicle resting on two wheels and having three shelves which are loaded in the dining car



The Wagonette in Use

with sandwiches, lunch boxes, fruit, pies, cold meat, hot coffee and chocolate served in thermos bottles, together with the necessary cups and saucers, knives, forks, spoons, etc. The first wagonette was placed on the "Pacific Limited" as an experiment. This has proved so satisfactory that the company plans to equip other trains. The service was installed by Allan Pollok, superintendent of dining cars, hotels and restaurants

**POULTRY DEMONSTRATION TRAIN IN ENGLAND.**—A poultry demonstration train consisting of four coaches, which has been equipped by the North-Eastern Railway Company in conjunction with the University of Leeds and the Yorkshire Council for Agricultural Education, is making a tour of Yorkshire. The exhibits consist of a pen of six pullets kept on the intensive system, poultry appliances, foods, incubators, charts, and diagrams. The train is well staffed with lecturers, among whom is the lecturer in poultry keeping at the University of Leeds. The object of the tour is to interest and instruct people in intensive poultry culture.

## REORGANIZATION OF PERE MARQUETTE

The Pere Marquette was reorganized at a meeting held in New York City on April 11 under the name of the Pere Marquette Railway Company. E. N. Brown, formerly president of the National Railways of Mexico, was elected chairman of the board of directors, and Frank H. Alfred, general manager for the receivers, was elected president and general manager. The company will operate 2,285 miles, including 1,826 miles of road owned, 229 miles of road controlled through ownership of at least 99 per cent of all outstanding securities, and 230 miles of road operated under lease or trackage agreements. The company has leased to other companies 37 miles of road owned and also owns 758 miles and controls or leases 117 miles of sidetracks.

The plan of reorganization provides for the reduction of the bonded indebtedness from \$87,012,919 to \$36,325,000, \$6,000,000 of the bonds being sold for cash. In addition, stocks have been sold for cash, producing, with the bonds, \$16,000,000. The completion of the reorganization has left the new company with \$8,000,000 cash on hand. The interest charges of the old company, amounting to \$4,127,340, have been reduced to \$1,687,760. The Michigan Public Service Commission some time ago approved the plan of reorganization calling for the issue of \$105,000,000 securities, with the reservation that "it will not be inferred that the commission is of the opinion that the property of the Pere Marquette Railroad Company has a value of \$105,000,000 measured by any legally recognized standard. The commission is clearly of the opinion that it has not such present value."

The Pere Marquette has passed out of a receivership for the second time in ten years. When the Cincinnati, Hamilton & Dayton was sold by the Morgan interests to the Baltimore & Ohio they were unsuccessful in disposing of the Pere Marquette at the same time, with the result that the company was left without adequate credit upon its reorganization. After suffering a deficit of \$1,813,761 in the fiscal year ending June 30, 1911, receivers were again appointed for the road in 1912. Rumors that "watered bonds" and mismanagement had caused the road to operate at a loss led to an investigation by a joint committee of the Michigan legislature, which submitted its final report on April 24, 1913. Although the committee found that there had been some mismanagement of the property under former administrations, it failed to find evidence of watered bonds, saying that it was satisfied that the money represented by the funded debt of approximately \$70,000,000 had been paid into the Pere Marquette corporation, that all the bonds were honest, that none of them was watered, and that persons owning them had honest claims against the Pere Marquette. The committee also expressed the opinion that the flat two-cent per mile passenger rate was too low for branch lines, and also that freight rates

were inadequate. With reference to the management under the receivership, the committee expressed its belief that it was capable and doing much to improve the service and should be given a reasonable opportunity to demonstrate whether the road could be made to earn its fixed charges.

The confidence of the committee in the ability of the receivers was not misplaced. By drastic economies in all departments and skillful operation, expenses were decreased to the minimum and revenues built up so that the annual report for the fiscal year ending June 30, 1915, showed a net operating income of \$4,072,481, as compared with a net operating deficit of \$1,762,145 for the previous year. The record for the succeeding year was even better, the net operating income in 1916 being \$6,053,000, an increase over 1915 of \$1,981,000. The ratio of expenses to operating revenues in 1916 was 68.51 and in 1915 74.57. The average train-load of revenue freight was 519 tons, or an increase of 54 tons, as compared with 1915. Loaded freight car mileage was increased by 12.24 per cent and empty freight car mileage decreased by 13.17 per cent. Although revenue locomotive mileage increased 3.58 per cent there was a decrease in the number of tons of coal consumed. There were 12,000 less claims presented in 1916 than in 1915 and \$57,000 less was paid out for loss and damage to freight. The average expenditure from maintenance of way was \$878 per mile, which Frank H. Alfred, general manager for the receivers, maintained was sufficient in view of the large proportion of the Pere Marquette's branch line mileage, which does not justify large expenditures for renewals and upkeep.

In making as good a showing as the Pere Marquette has, credit is due to lower officers as well as higher officers. Such a showing could only result, of course, from team work, and the election of Mr. Alfred as president is evidence of how much he did, but mention

should be made of the work of Paul H. King as one of the receivers. Mr. King, when he was appointed receiver of the Pere Marquette, was a lawyer, not a railroad man, but he possessed a personality that would make for success in any line of endeavor. He learned the essentials of good railroading in a very short time; he could speak convincingly and interestingly in his dealings with the problems of managing a bankrupt road; he succeeded in convincing the people of Michigan that he was sincerely trying to give them the best service that the Pere Marquette was capable of with the money and facilities that it had; he took advantage of every opportunity to talk, either with individuals or from the speaker's platform, to all classes of people in Michigan, and it is safe to say that not only were his efforts of great direct value to the Pere Marquette, but they were also fruitful of good results for railroads in general.

Because of its location on a peninsula with water on three sides a large proportion of the Pere Marquette business is local, whereas in getting business from Chicago through De-



E. N. Brown

troit it has keen competition with roads better able to bear the heavy expenses incident to handling through traffic. Although the Pere Marquette serves a large part of the lower peninsula formerly producing much lumber but now thinly populated and of little importance agriculturally, it carries freight and passengers at no higher rates than roads much better situated from the point of view of traffic density. Its average revenue per ton per mile was 6.44 mills in 1916 as compared with 5.92 mills for the New York Central. Its revenue per passenger mile was 1.993 cents, or slightly above the revenue per passenger for the New York Central of 1.894 cents. Granted fair rates the Pere Marquette should become a paying property.

Edward Nonphlet Brown, who has been elected chairman of the board of directors of the company, was president of the National Railways of Mexico until the disturbed political conditions of that country necessitated his resignation and return to the United States. He has gained most of his railway experience in Mexico where he spent 30 years helping build up the transportation system of which he became president. In his Mexican experience he became thoroughly familiar with the problems of the railway engineer, the operating officer and the executive on a system in the process of development. As chairman of the board of the Pere Marquette he comes to the road when the problems involved in the improvement of existing facilities are of major importance. With his wide and varied experience and his thorough schooling in all departments of railroading he is well fitted to direct the affairs of the Pere Marquette and to insure its successful operation if that is possible under good management.

Mr. Brown was born in Barbour county, Ala., March 23, 1862, and entered railway service in 1878 as a rodman and chainman on preliminary surveys and location with the Northeastern Railroad of Georgia, following which he was engineer on the construction of the Richmond & Danville. After taking a post-graduate collegiate course, he was division engineer, resident engineer and locating engineer of the Central of Georgia between June, 1883 and July, 1887. His railroad experience in Mexico began in July, 1887, when he became engineer in charge of the construction of the Mexican National Railway between Saltillo and San Luis Potosi, Mex. In September, 1888, he was transferred to the operating department, becoming division superintendent at San Luis Potosi. From December, 1889, to December, 1892, he was division superintendent of the same railroad at Mexico City, and from the latter date to March, 1902, was general superintendent. His executive experience dates from March, 1902, when he was made vice-president and general manager, following which he became second vice-president and general manager on June 3, 1902, and in April, 1904, president of the reorganized road, the National Railroad of Mexico, the Mexican International Railroad and the Texas-

Mexican Railway. In 1909, he became president of the National Railways of Mexico and continued in that capacity until July, 1913, when he resigned on account of the turbulent civil conditions in the country. He withdrew his resignation in October, 1913, after coming to an agreement with the Mexican authorities, but was again forced to resign in October, 1914, when internal strife again assumed dangerous proportions.

It is fortunate for the road that Frank H. Alfred, who becomes president, has spent most of his railroad career with the Pere Marquette and since its last receivership has been largely responsible for its transformation from a road without adequate credit and in poor physical condition into a paying property. The skillful economies he introduced into all branches of the service will no doubt be continued under the new organization. Like Mr. Brown, he combines engineering ability with operating and executive capacity.

Mr. Alfred entered the service of the Pere Marquette as an assistant engineer in 1900 and with the exception of an interval of five years with other companies has been with that road ever since. He has practically grown up with the road and combines the point of view of the chief engineer and general manager with that of the subordinate employee in the ranks. He was born at Logan, Ohio, on December 24, 1866, and was educated at the University of Michigan and Ohio State University. He began railway work in 1887, as rodman on construction of the Columbus, Lima & Milwaukee, and later was made resident engineer. From March, 1889, to 1894, he was assistant engineer of the Norfolk & Western in charge of the construction of the terminals at Columbus, Ohio, and from the latter date until April, 1896, was assistant to the chief engineer of the Hocking Valley. He was then successively engineer maintenance of way of the Cleveland, Akron & Columbus and the Wheeling & Lake Erie, and



Frank H. Alfred

in 1900 became assistant engineer of the Pere Marquette. He was made chief engineer in October, 1902, resigning on October 1, 1905, to become manager of the Canadian White Company, Limited, of Montreal, Que. In 1908, he returned to railway service as assistant to the president of the Cincinnati, Hamilton & Dayton, and from August, 1910, to April, 1912, was general superintendent at Cincinnati, Ohio. He then returned to the Pere Marquette as assistant general manager, was later made general manager and chief executive officer to the receivers, at Detroit, Mich.

John L. Cramer, who has been elected secretary and treasurer, has been with the Pere Marquette since October, 1904, when he became comptroller of the Cincinnati, Hamilton & Dayton-Pere Marquette system. In December, 1907, when the two roads were separated, he became vice-president and comptroller of the Pere Marquette and following its receivership in 1912 has been comptroller. Previous to his connection with the Pere Marquette he was assistant comptroller of the Chicago, Rock Island & Pacific at Chicago.

# Firebox Volume and Boiler Performance

## Effect of Increased Volume on Combustion and Firebox Evaporation; Firebox vs. Tube Heating Surfaces

By J. T. Anthony

**L**OCOMOTIVE hauling capacity depends upon boiler steaming capacity. Boiler steaming capacity is limited primarily by the amount of heat that can be made available in the firebox. Both the capacity and the efficiency of the boiler are determined largely by the capacity and efficiency of the firebox as a heat generator.

We think of coal as burning on the grates; but, as a matter of fact, a large portion burns above the fuel bed in the form

Assume, for example, that 50 per cent of the fixed carbon is completely burned on the grates and 50 per cent is incompletely burned to CO. Under these conditions, only 40 per cent of the heat would be liberated on the grate, while 60 per cent would be liberated by the burning of the gases in the combustion chamber space.

We have assumed that the combustion in the firebox is complete. Under the conditions, however, perfect combustion could not be obtained. With an air supply of  $12\frac{1}{4}$  lb. there is an excess of 2.76 per cent free oxygen in the final products of combustion; but this is not sufficient to guarantee complete combustion, on account of the presence of the large volumes of inert gases, which interfere with the mixing of the oxygen with the combustibles; and also on account of the short time available for combustion of each particle of gas, and the limited flameway and combustion chamber volume.

The velocity with which the combustible gases burn de-

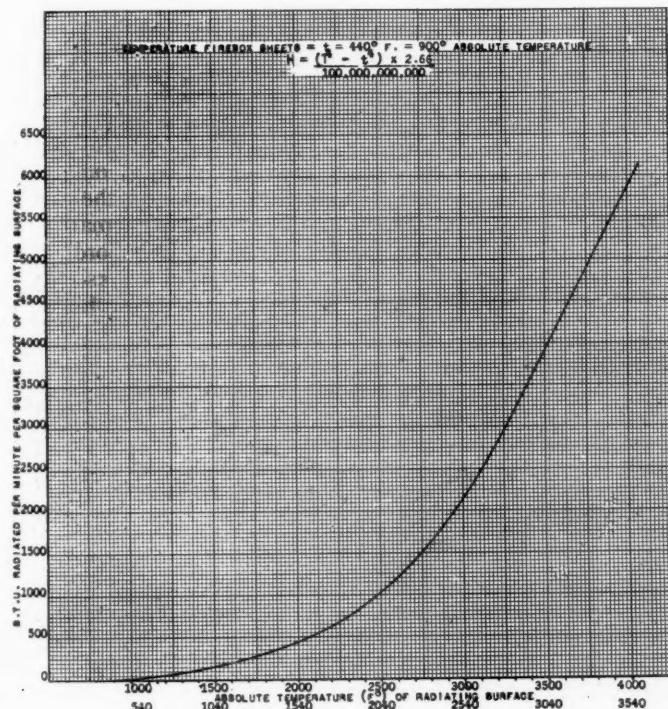


Fig. 1

of gas. Consider the case of a large boiler such as is used on a Pacific or Mikado type engine,—with 70 square feet of grate, 311 cubic feet of firebox volume, 232 square feet of firebox heating surface and 22-ft. tubes, with 5,280 sq. ft. of tube and superheating surface—the firebox being without a combustion chamber but equipped with brick arch; and the coal used being bituminous, with 57 per cent fixed carbon, 35 per cent volatile and a heat value of 14,400 B. t. u. per pound.

At a rate of combustion of 120 lb. of coal per sq. ft. of grate per hour, 8,400 lb. were fired (which is equivalent to 140 lb. per minute or  $2\frac{1}{3}$  lb. per second). If all the fixed carbon burned on the grate, there would be liberated 58 per cent of the heat contained in the coal, while 42 per cent would be liberated by the volatile combustible burning above the fuel bed.

However, all of the fixed carbon does not burn on the grate. Tests indicate that often there is as much as 80 per cent of the fixed carbon incompletely burned to CO; and in order to avoid a large heat loss, this CO must be mixed with a sufficient amount of oxygen to enable it to be completely burned in the combustion chamber space above the fuel bed.

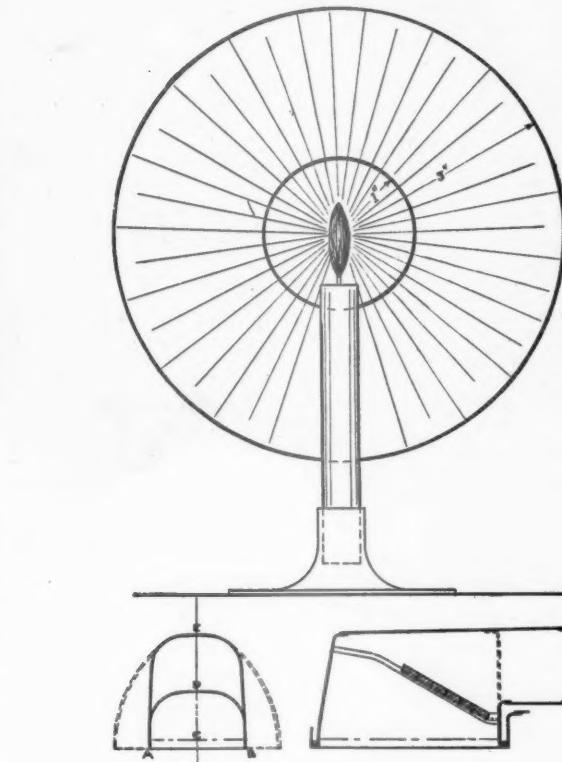


Fig. 2

pends upon the volume percentages of the combustible and the oxygen present. For instance, with the gases arising from the fuel bed containing five per cent CO and 12 per cent oxygen, the velocity of combustion would be proportional to  $5^2 \times 12 = 300$ . Where combustion is nearly complete and the gases contain say, one per cent CO and three per cent O, the velocity of combustion would be proportional to  $1^2 \times 3 = 3$ ; or, it would be 100 times more rapid in the first than in the second case. This slowness of combustion can be offset by providing long flameway and ample combustion chamber space; but in the absence of these requirements, com-

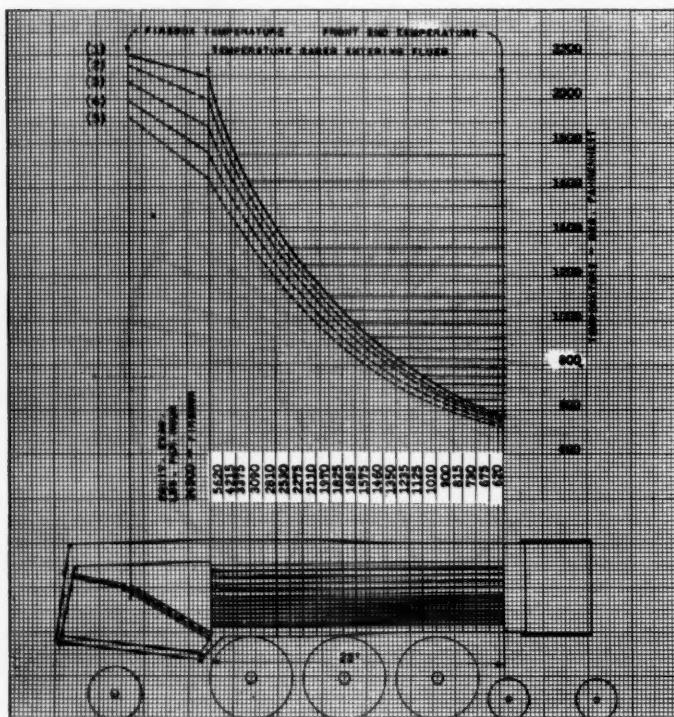
\* Abstract of a paper read before the Railway Club of Pittsburgh.

bustion must be speeded up by increasing the supply of oxygen, if perfect combustion is to be obtained.

As shown, the total volume of gases evolved per second is more than 2,000 cubic feet. The firebox has an effective volume of 285 cubic feet,—which means that the firebox is being filled and re-filled with gases about seven times per second; or, that the time which is available for the combustion of each particle of gas will average less than one-seventh of a second.

Under the above conditions, if perfect combustion had been obtained and all of the heat liberated, each cubic foot of firebox volume would have evolved heat sufficient to produce  $7\frac{1}{2}$  boiler horsepower per hour; and each square foot of grate, 20 horsepower per hour.

As a matter of fact, however, the over-all boiler efficiency was only 54 per cent; and the boiler horsepower of 1956 was developed at a rate of four horsepower per cu. ft. of firebox volume and 11 horsepower per sq. ft. of grate per hour. The large volume of gases evolved and the amount of heat generated by the burning of these gases emphasize the importance of firebox volume and combustion chamber space. The fuel bed is but little more than a gas producer,—and ade-



The curves are for the following hourly rates of combustion:

- (1) 120 lb. per sq. ft. of grate
- (2) 100 lb. per sq. ft. of grate
- (3) 80 lb. per sq. ft. of grate
- (4) 60 lb. per sq. ft. of grate
- (5) 40 lb. per sq. ft. of grate

Fig. 3

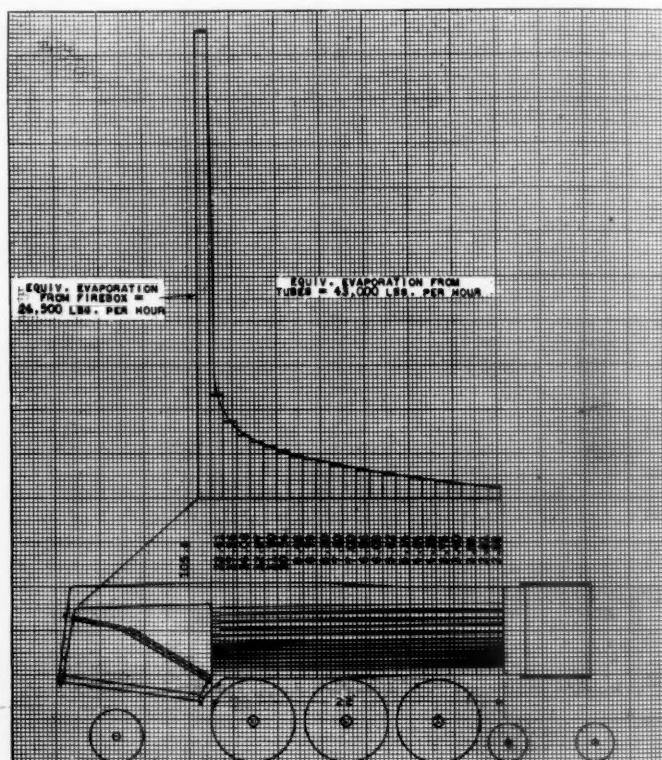
quate provisions must be made for burning the gases thus produced if perfect combustion and high capacity are to be obtained.

One square foot of firebox heating surface is generally supposed to be equal to from five to 10 sq. ft. of flue heating surface, and often has a higher value; for firebox evaporation depends upon two variable factors,—one of which is temperature.

Firebox heating surfaces receive their heat by radiation and by convection,—the latter playing but a small part. A dry, transparent gas will not radiate heat to any perceptible extent, nor will it receive radiant heat. The hot gases of com-

bustion passing through the firebox and flues give up their heat only by coming in actual contact with the cooler heating surfaces. Flames, which are burning gases, do radiate heat, but the transparent gases passing through the flues do not radiate heat.

The amount of heat radiated to the firebox heating surfaces depends upon the difference in temperature between the radiating surfaces and the firebox heating surfaces; and upon the area or extent of the radiating surfaces. In a locomotive firebox, these radiating surfaces consist of the grate



The chart shows equivalent evaporation per hour from the firebox and from each one-foot section of tubes when burning 120 lb. of coal per sq. ft. of grate per hour. The figures show equivalent evaporation per sq. ft. of heating surface per hr.

Fig. 4

when covered with live coals, the luminous flames and the hot brick-work which it may contain.

According to the well-known Stefan-Boltzmann law, a hot body—such as a fuel bed and flames—will radiate a certain amount of heat per unit of time per square foot of radiating surface, the amount so radiated being equal to a constant times the difference between the fourth powers of the temperatures of the radiating surfaces and the heat-receiving surfaces. These temperatures are absolute: that is, temperatures equal to the ordinary temperatures as read on the Fahrenheit scale, plus 460 deg. By using as the temperature of the firebox sheets 460 deg. F. (or 900 deg. absolute) the chart in Fig. 1 has been plotted to show the B. t. u. radiated per minute per square foot of radiating surface at different temperatures of the fuel bed, or radiating surfaces. It will be noticed that the increase in amount of heat radiated is not at all proportional to the temperature, but increases at a very much faster rate. At an absolute temperature of 2,100 deg., each square foot of fuel bed radiates 500 B. t. u. per minute. Increasing this temperature to 2,500 deg. absolute, we double the amount of heat radiated. By increasing the temperature to 3,000 deg. absolute, we get more than four times as much radiation.

It is evident from this that a small increase in firebox temperature will have a marked effect upon the amount of

heat radiated and upon the evaporation. While a reduction in the temperature of the firebox heating surfaces will also increase the amount of heat radiated, it does so to a very much smaller extent and the opportunity for increasing the firebox evaporation by reducing the temperature of the heating surfaces is very small. The principal means of increasing firebox evaporation is by increasing the temperature of the radiating surfaces, or by increasing their area. From this it follows that increasing firebox surfaces without increasing heat-radiating surfaces will have little effect upon the firebox evaporation.

The truth of this can easily be demonstrated. The candle illustrated in Fig. 2 radiates heat and light equally in all directions. Suppose this flame to be inclosed by a hollow iron sphere; all of the heat or light radiated by the flames would be taken up by the inner surface of the sphere. Increasing the radius of the sphere will increase the area of the surfaces receiving the radiated light or heat; but there has been no change in the amount of heat or light so radiated. The surfaces of the larger sphere would receive the same amount of heat or light as the surface of the smaller sphere; but the unit of surface—such as one square inch or one square

these methods of increasing the heating surface will increase the volume of the firebox.

The amount of flames in a firebox will depend primarily upon the amount of combustible gas being driven off, the air supply and the volume of the firebox. If the amount of gas being burned is sufficient to fill the firebox completely with flame, the effective flame-radiating surfaces will practically equal the exposed heating surfaces of the firebox. In other words, when the firebox is completely filled with flame, the flame-radiating surfaces can be considered as an envelope or film, virtually in contact with the firebox heating surfaces at all points. If these conditions are fulfilled, it follows that the area of the flame-radiating surfaces will equal the area of the firebox heating surfaces.

As we have seen, increasing the heating surfaces increases the volume; and if this added volume is filled with flame, the increase in radiating surfaces is proportionate to the increase in heating surface. If the additional volume is not filled (or partly filled) with flame, there will be little or no increase in firebox evaporation.

Firebox evaporation depends principally upon two factors: high firebox temperature and large radiating surfaces, and only indirectly upon the extent of the firebox heating surfaces.

The value of a combustion chamber being admitted, what of the decrease in tube evaporation brought about by reducing the tube lengths in order to incorporate a combustion chamber?

The curves in Fig. 3 show the characteristic drops in temperature of the gases in passing through the tubes, when burning coal at varying rates per sq. ft. of grate per hour. Suppose the flues to have been divided into 22 equal sections, each one foot in length and containing 240 sq. ft. of heating surface. With a constant weight of gases passing through, the drop in temperature through each one-foot section becomes a measure of the evaporation in that section; and the figures showing the total equivalent evaporation from each section and the equivalent evaporation per square foot of heating surface were calculated from the temperature drops and the weight of the gases,—assuming the specific heat to be constant throughout.

With an equivalent evaporation per square foot of firebox heating surface of 105.6 lb. per hour, the average evaporation per square foot of flue heating surface would be 8.14 lb. per hour, this evaporation ranging from 23.4 lb. in the section next to the firebox down to 2.58 lb. per sq. ft. in the section adjacent to the front tube sheet. It will be noted that the first four sections from the front end have a total equivalent evaporation of only 2,840 lb. per hour,—or about half that produced by the one section adjacent to the firebox.

A reduction of the tube lengths to, say 18 ft., by the application of a four-foot combustion chamber, would reduce the tube heating surface 960 sq. ft., increase the firebox surface by 76 sq. ft. and add 108 cu. ft. to the firebox volume. What effect would such a change have upon the boiler evaporation and efficiency?

More than 25 per cent of the heat contained in the coal is lost through imperfect combustion, when firing at the rate of 120 lb. per sq. ft. of grate per hour. If the additional firebox volume obtained by the use of the combustion chamber effected a saving of one-fourth of this heat loss, the resulting combustion would cause an increase in firebox evaporation of approximately 8,025 lb., to offset the 2,840 pounds lost by shortening the tubes. This increased firebox evaporation would be obtained by the generation of heat that would otherwise have been lost, and there would be little reduction in the temperature of gases entering the tubes. The front end temperature would be increased; but there would be a net increase in boiler efficiency, due to the combustion chamber, of 7½ per cent.

The relative evaporation from the firebox and tube heating

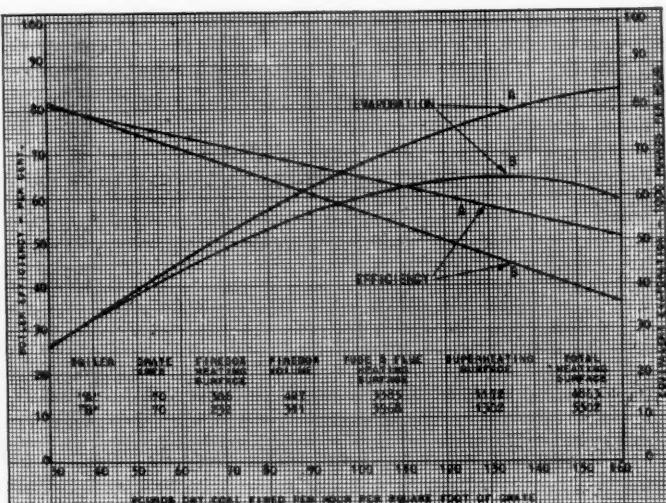


Fig. 5

foot—of the larger sphere will receive less heat than the unit of surface of the smaller sphere.

The intensity of the heat diminishes as the distance increases; but the total amount of heat radiated remains the same. It might appear from this that by doubling the distance from the fuel bed to the crown sheet in the locomotive firebox, we would get only one-fourth as much heat for each square foot of firebox heating surface—but such is not the case.

Referring to Fig. 2, where *ACB* represents the fuel bed and *CD* the distance from the fuel bed to the crown sheet: It is evident that increasing the distance from *CD* to *CE* increases the firebox heating surface from *ADB* to *AEB*; and it is also evident that the latter is not four times as great as the former. In this case, the evaporation per square foot of heating surface would be decreased in almost direct proportion to the increase in heating surface, if there were no changes made in the total area or temperature of the radiating surfaces.

Flame radiates heat and it would be a logical supposition that increasing the mass of flame in the firebox would increase the amount of radiant heat given off. Such seems to be the case. Increasing firebox heating surfaces generally increases firebox volume. This can be accomplished by increasing the depth or width of the firebox, or by adding combustion chambers. Fig. 2 clearly shows that any one of

surfaces is shown by the curve in Fig. 4. The base of the rectangle represents the heating surface—240 sq. ft. for each section on the tubes and 232 sq. ft. for the firebox. The height of the rectangle indicates equivalent evaporation per square foot of heating surface per hour, while the area of each rectangle represents the total evaporation per hour. The curve drawn through the top of the rectangles shows in startling form the evaporation from the firebox and combustion chamber heating surface as compared to tube heating surfaces,—particularly the forward portion of long tubes.

That boiler capacity and efficiency does not depend upon the mere extent of heating surface is plainly indicated by the curves in Fig. 5. The two boilers represented were alike except that boiler A had a three-foot combustion chamber, which was installed by making a three-foot reduction in the tube lengths. Boiler A had only 4,863 sq. ft. of heating surface, as compared with 5,502 sq. ft. for boiler B; but the decrease in heating surface, due to the installation of the combustion chamber, did not decrease the capacity or efficiency of the boiler. Throughout the range of tests, the combustion chamber boiler had a higher efficiency and a higher capacity; and, as the rate of firing increased, the superiority of the combustion chamber boiler became more marked. At the rate of 120 lb. per sq. ft. of grate per hour, the combustion chamber boiler had an over-all efficiency of 60 per cent as against an over-all efficiency of 50 per cent for the straight-firebox boiler. While this difference was not due solely to the combustion chamber, it was due entirely to furnace conditions and serves to show the influence of the furnace upon the efficiency and capacity of the boiler as a whole.

#### SAVING EFFECTED BY BREAKING SCRAP

Although the management of every railroad attempts to produce transportation at the lowest possible cost and great care is taken to secure the maximum efficiency in shop operation, in the complex organization of the railroad, the minor factors are apt to be slighted and there is a tendency to overlook the possibilities of securing increased revenue from those sources which might be called the by-products of transpor-



Locomotive Crane Breaking Large Scrapped Castings

tation. An interesting instance of saving effected in an unusual manner is the practice of breaking scrap before disposing of it which has recently been instituted by The Buffalo, Rochester & Pittsburgh. So far as we have been able to ascertain there are very few roads which are following this practice, but the method is so profitable that it will no doubt be adopted wherever scrap is handled in considerable quantities.

Large castings, such as cylinders, driving wheel centers, deck castings, etc., cannot be sold to foundries and are

usually bought by scrap dealers, who must unload the castings, break and reload them, also paying freight charges. Under ordinary conditions the broken scrap will bring about \$14 a ton and the unbroken castings only \$8 a ton, the business is profitable for the scrap dealer, but it is still more profitable for the railroads.

The road above mentioned is now making a practice of carrying all large castings to a pit, where they are broken by dropping a large weight on them, a 15-ton locomotive crane being used to raise the weight and also to handle the castings when necessary. About 26 tons of castings may be broken in a day, the cost per day for operation of the hoist being as follows:

Engineer, 10 hrs. at 34 cents.....	\$3.40
Coal, $\frac{1}{2}$ ton at \$1.25.....	.63
Valve oil, one pint at 48 cents per gal.....	.06
Engine oil, 1 qt. at 28 cents per gal.....	.07
Miscellaneous supplies .....	.10
Repairs, including general repairs.....	.91
	\$5.17

Interest and depreciation are not included in these figures, and if they were added, the cost of operation would be between \$8 and \$10 a day.

The locomotive crane is, of course, used for general service and the only special equipment required for breaking scrap is two weights, the larger weighing 8,000 lb. and the smaller 3,500 lb. These have convex bottoms for breaking the castings, while the tops are flat to enable the magnet to catch them readily.

Taking the maximum figure of \$10 a day as the cost of operation of the hoist, the cost of breaking scrap is as follows:

Cost of hoist per day.....	\$10.00
Labor, one helper at 20 cents per hour.....	2.00
<hr/>	

#### The value of the scrap is:

Broken scrap, 26 tons at \$14 per ton.....	\$364.00
Unbroken scrap, 26 tons at \$8 per ton.....	208.00
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Increase in value.....	\$156.00
Cost of breaking.....	12.00
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Net gain by breaking scrap.....	\$144.00

Of course, this saving is not made every day, as it is only about once a month that a carload of large scrap accumulates, but the gain in a year's time is a considerable item. It would seem a measure of economy for all railroads to break their scrap almost regardless of the method used.

**BATH TRAINS USED IN WAR.**—According to an article in the Medical Record by Doctor Guy Hinsdale, bath trains are now used extensively by the European armies. "These are in use in Austria and Hungary, and also in Servia; doubtless, also, in Germany and France. The trains are provided with sterilizing equipment, usually a refrigerator car into which steam is introduced. When baths are required the hot water is obtained from the locomotive. One of these trains has two cars with thirty bath-tubs each, two tank cars to supply the water, one car for undressing, four freight cars with clean linen, a sleeping car for the personnel of the train, and two or three cars for the disinfection of clothing. This arrangement permits 1,200 men in the course of ten hours to take a shower bath and have all their clothing thoroughly sterilized."

**THE NEW ZEALAND GOVERNMENT RAILWAYS.**—Comparatively little was done on new construction by the New Zealand and Government Railways during 1916 and not much is planned for 1917. Work is progressing slowly on the 5-mile single track railway tunnel through the Southern Alps at Arthur's Pass, to connect Greymouth, the most important port on the west coast of South Island, with Christchurch. When completed this will provide an overland outlet for the splendid steam and gas coal mined in the Greymouth district.—*Commerce Report*.

# Organization of the Railways for War

## A. R. A. Committee, Sub-Committees and General Agents at Military Headquarters; Mobilization Points

THE executive committee of the American Railway Association Special Committee on National Defense, whose organization for the purpose of formulating policies for the operation of the railways practically as a system during war time was announced in last week's issue, is expected to hold its first meeting at Washington the latter part of this week. The committee hereafter will sit in Washington in frequent or, if necessary, continuous session. The authority of the committee was defined in general terms in the resolution, quoted in last week's issue, adopted at the meeting of railway executives on April 11, at which the roads agreed to commit the whole problem of co-operation with the government to the Special Committee on National Defense and to "co-ordinate their operations during the present war in a continental railway system, merging during such period all their merely individual and competitive activities in the effort to produce a maximum of national transportation efficiency."

By another resolution adopted at that meeting, the railways agreed "to the direction of the executive committee in all matters to which its authority extends as expressed in the resolution heretofore adopted," and to which those present subscribed, and the general secretary of the American Railway Association was instructed to secure the execution by signature agreement of all American railways. The Interstate Commerce Commission has been asked to designate one of its members to be ex-officio a member of the executive committee and the Car Service Commission of the American Railway Association, which has been sitting at Washington for the purpose of dealing with the conditions of car shortage and congestion in co-operation with the Interstate Commerce Commission, has been made a sub-committee of the Special Committee on National Defense.

As announced last week, the membership of the Special Committee on National Defense was increased from 18 to 28, in order to provide for district committees in the new northeastern and southeastern army departments and is now constituted as follows:

### GENERAL COMMITTEE

Northeastern Department: J. H. Hustis, receiver, Boston & Maine, Chairman; H. M. Biscoe, vice-president, Boston & Albany; Howard Elliott, president, New York, New Haven & Hartford; Morris McDonald, president, Maine Central.

Eastern Department: L. F. Loree, president, Delaware & Hudson, Chairman; W. G. Besler, president and general

manager, Central of New Jersey; Samuel Rea, president, Pennsylvania Railroad; A. H. Smith, president, New York Central Lines; A. W. Thompson, vice-president, Baltimore & Ohio.

Southeastern Department: W. J. Harahan, president, Seaboard Air Line, Chairman; J. R. Kenly, president, Atlantic Coast Line; R. V. Taylor, vice-president and general manager, Mobile & Ohio; W. A. Winburn, president, Central of Georgia.

Central Department: R. H. Aishton, president, Chicago & North Western, Chairman; E. E. Calvin, president, Union Pacific; Hale Holden, president, Chicago, Burlington & Quincy; C. H. Markham, president, Illinois Central; G. L. Peck, fourth vice-president, Pennsylvania Lines; G. T. Slade, first vice-president, Northern Pacific.

Southern Department: W. B. Scott, president, Southern Pacific, Texas-Louisiana Lines, Chairman; B. F. Bush, receiver, Missouri Pacific; Julius Kruttschnitt, chairman, executive committee, Southern Pacific; C. E. Schaff, receiver, Missouri, Kansas & Texas.

Western Department: William Sproule, president, Southern Pacific, Pacific system, Chairman; J. D. Farrell, president, Oregon-Washington Railroad & Navigation Company; R. S. Lovett, chairman, executive committee, Union Pacific; E. P. Ripley, president, Atchison, Topeka & Santa Fe.

Fairfax Harrison, president of the Southern Railway, is general chairman of the committee and chairman of the executive committee, which, as previously stated, includes Messrs. Rea, Elliott, Holden and Kruttschnitt, with Daniel Willard, chairman of the Advisory Commission of the Council of National Defense ex-officio. George Hodges, chairman of the committee on Relations between Railroads and assistant to the general chairman of the Special Committee on National Defense, has been appointed secretary of the executive committee. J. E. Fairbanks, general secretary of the American Railway Association, is secretary of the Special Committee.

### SUB-COMMITTEES

Sub-committees have been appointed as follows:

Commission on Car Service: C. M. Sheaffer, general superintendent transportation, Pennsylvania Railroad, Chairman; W. L. Barnes, superintendent transportation, Chicago, Burlington & Quincy; W. C. Kendall, superintendent transportation, Boston & Maine; G. F. Richardson, superintendent transportation, Southern Pacific; J. A. Somerville, general superintendent transportation, Missouri Pacific; D. E. Spang-



George Hodges

ler, superintendent transportation of the Norfolk & Western. Military Equipment Standards: J. T. Wallis, general superintendent motive power, Pennsylvania Railroad, Chairman; C. E. Chambers, superintendent motive power, Central of New Jersey; C. A. Lindstrom, assistant to president, Pressed Steel Car Company; F. W. Mahl, director of purchases, Southern Pacific; Peter Parke, chief engineer, The Pullman Company; R. E. Smith, general superintendent, mo-

A. White, general auditor of the New York Central. Military Passenger Tariffs: E. L. Bevington, chairman, Transcontinental Passenger Association, Chairman; F. C. Donald, commissioner, Central Passenger Association; W. H. Howard, secretary, Southeastern Passenger Association; C. L. Hunter, vice-chairman, Trunk Line Association; W. L. Pratt, chairman, New England Passenger Association.

Military Freight Tariffs: L. Green, vice-president, South-



**C. M. Sheaffer**  
General Superintendent Transportation, Pennsylvania Railroad



**J. T. Wallis**  
General Superintendent of Motive Power, Pennsylvania Railroad



**A. H. Plant**  
Controller, Southern Railway



**E. L. Bevington**  
Chairman, Transcontinental Passenger Association



**Lincoln Green**  
Vice-President Southern Railway

tive power, Atlantic Coast Line; C. B. Young, mechanical engineer, Chicago, Burlington & Quincy.

Military Transportation Accounting: A. H. Plant, comptroller, Southern, Chairman; M. P. Blauvelt, comptroller, Illinois Central; G. R. Martin, vice-president, Great Northern; A. D. McDonald, vice-president, Southern Pacific; C. B. Seger, vice-president and comptroller, Union Pacific; C. I. Sturgis, general auditor, Chicago, Burlington & Quincy; R.

ern, Chairman; E. B. Boyd, chairman, Western Trunk Line Association; L. E. Chalenor, chairman, Southeastern Freight Association; R. H. Countiss, chairman, Transcontinental Freight Bureau; F. A. Leland, chairman, Southwestern Tariff Commission; C. C. McCain, chairman, Trunk Line Association; E. Morris, chairman, Central Freight Association.

The following general agents have also been appointed:

#### GENERAL AGENTS AT MILITARY HEADQUARTERS

##### Transportation

Washington, D. C. ....	J. G. Rodgers, general superintendent .....
Northeastern Department .....	D. S. Brigham, assistant to general superintendent.....
Boston, Mass. ....	Boston & Albany R. R.
Eastern Department .....	R. L. O'Donnell, general superintendent.....
Governor's Island, N. Y. ....	Pennsylvania Railroad.
Southeastern Department .....	H. M. Cobb, executive general agent.....
Charleston, S. C. ....	Southern Railway System.
Central Department .....	M. J. Gormley, president's assistant .....
Chicago, Ill. ....	Chicago & North Western Ry.
Southern Department .....	C. L. McManus, representative .....
Ft. Sam Houston, Tex. ....	American Railway Association.
Western Department .....	Wm. Sproule, president .....
San Francisco, Cal. ....	Southern Pacific Company.

(Represented by G. F. Richardson, supt. trans.)

##### Accounting

A. H. Plant, comptroller, Southern Railway.
W. J. Hobbs, comptroller, Boston & Maine R. R.
R. A. White, general auditor, New York Central R. R.
H. C. Prince, comptroller, Atlantic Coast Line Ry.
M. P. Blauvelt, comptroller, Illinois Central R. R.
G. R. Cottingham, auditor, G. H. & S. A. Ry.
A. D. McDonald, vice-president, Southern Pacific Co.

## GENERAL AGENTS AT MOBILIZATION POINTS

State	Transportation	Accounting
Connecticut	Samuel Baker, special examiner New York, New Haven & Hartford R. R.	A. A. Drummond, N. Y., N. H. & H. R. R.
Maine	Chas. K. Hall, traveling passenger agent, traffic department Maine Central R. R.	H. T. Leighton, Maine Central R. R.
Massachusetts	D. S. Brigham, assistant to general superintendent Boston & Albany R. R.	J. J. Markward, Boston & Albany R. R.
New Hampshire	L. J. McNamara, passenger traffic department Boston & Maine R. R.	W. J. Harrod, Boston & Maine R. R.
Rhode Island	R. E. Wilson, train master New York, New Haven & Hartford R. R.	A. R. Gates, N. Y., N. H. & H. R. R.
Vermont	J. W. Wardlaw, assistant to president Central Vermont Ry.	F. A. Dougherty, Rutland Railroad.
Delaware	I. B. Sinclair, assistant train master Pennsylvania Railroad.	William Lentz, Pennsylvania Railroad.
District of Columbia	J. G. Rodgers, general superintendent Pennsylvania Railroad.	J. A. Timberlake, Southern Railway.
Maryland	W. L. Campbell, supervisor passenger train service Baltimore & Ohio Railroad.	W. F. Harman, Baltimore & Ohio R. R.
New Jersey	L. W. Berry, superintendent Central Railroad of New Jersey.	W. H. Oakes and W. A. Kiel, Central Railroad of New Jersey.
New York	F. E. Williamson, superintendent New York Central R. R.	B. G. Bartholomew, Southern Pacific S. S. Co. L. K. Luff, Delaware & Hudson Co.
Pennsylvania	R. C. Morse, passenger train master Cornwall & Lebanon R. R. (P. R. R.)	H. W. Siegrist, Pennsylvania Railroad.
Virginia	S. Nicholson, assistant superintendent Norfolk & Western Ry.	Joseph P. Baldwin, Chesapeake & Ohio Ry.
West Virginia	W. A. Ross, inspector transportation Chesapeake & Ohio Ry.	J. C. Cooke, Norfolk & Western Ry.
Alabama	J. A. Streyer, general manager M. D. & S. R. R. (S. A. L.)	E. M. Cunningham, Mobile & Ohio R. R.
Florida	T. W. Hansell, superintendent Atlantic Coast Line R. R.	William Budd, Jr., Florida East Coast Ry.
Georgia	M. B. Smith, terminal train master Central of Georgia Ry.	George F. Zealy, Central of Georgia Ry.
Mississippi	C. L. Bent, inspector passenger train and station service Illinois Central R. R.	R. C. Gucker, Mobile & Ohio R. R.
North Carolina	I. H. Smith, secretary to general superintendent Norfolk Southern R. R.	H. T. Fisher, Atlantic Coast Line R. R.
South Carolina	H. M. Cobb, executive general agent Southern Railway System.	B. B. McCaa (temporary), Seaboard Air Line Ry.
Tennessee	R. H. Bransford, contracting freight agent Louisville & Nashville R. R.	E. H. Pride, Louisville & Nashville R. R.
Colorado	G. C. Randall, superintendent transportation Colorado & Southern Ry.	Jas. E. Erwin, Denver & Rio Grande R. R.
Illinois	M. W. Dancy, division passenger agent Chicago & Alton R. R.	H. G. Nicholson, Chicago, Rock Island & Pacific Ry.
Indiana	F. N. Reynolds, in charge terminals Cleveland, Cincinnati, Chicago & St. Louis Ry.	Frank G. Cronin, Chicago, Indianapolis & Louisville Ry.
Iowa	John S. Rice, train master Chicago & North Western Ry.	J. R. Brice, Chicago, Milwaukee & St. Paul Ry.
Kansas	J. P. Carey, superintendent Union Pacific R. R.	G. W. Cahill, Atchison, Topeka & Santa Fe Ry.
Kentucky	F. L. Poindexter, assistant superintendent terminals Chesapeake & Ohio Ry.	E. J. Duane, Louisville & Nashville R. R.
Michigan	Herbert E. Newton, night train master Michigan Central R. R.	A. S. Dutton, H. J. Broderick, Michigan Central R. R.
Minnesota	Joseph Caldwell, assistant general passenger agent Chicago, Milwaukee & St. Paul Ry.	A. E. Bartelheim, Northern Pacific Ry.
Missouri	J. L. Kendall, assistant to general superintendent transportation Missouri Pacific Ry.	Herbert E. Dunham, John E. Fitzgerald, Missouri Pacific Ry.
Nebraska	E. Bignell, superintendent Chicago, Burlington & Quincy R. R.	H. P. Ochiltree, Union Pacific R. R.
North Dakota	O. F. Ohlson, assistant to general superintendent Northern Pacific Ry.	L. A. Hart, M. St. P. & S. S. M. Ry.
Ohio	O. C. Schaad, train master Pennsylvania Railroad.	J. B. Wagner, Pennsylvania Lines West.
South Dakota	J. N. Van Schoick, assistant superintendent transportation Chicago, Milwaukee & St. Paul Ry.	C. J. Vervais, Chicago, St. Paul, Minn. & Omaha Ry.
Wisconsin	J. J. Prentice, assistant superintendent Chicago, St. Paul, Minneapolis & Omaha Ry.	Cassius M. Clay, Chicago & North Western Ry.
Wyoming	H. L. Bell, superintendent Union Pacific Railroad.	Walter P. Gilbert, Colorado & Southern Ry.
Arizona	F. P. Cruice, general freight and passenger agent Atchison, Topeka & Santa Fe Ry.	Chas. L. Yarbrough, Arizona Eastern R. R.
Arkansas	Kepler Johnson, train master Chicago, Rock Island & Pacific Ry.	James Heston, St. Louis Southwestern Ry.
Louisiana	C. P. Fegan, district passenger agent Texas & Pacific Ry.	Geo. H. Kaupp, Vicksburg, Shreveport & Pacific Ry.
New Mexico	J. P. Fitzpatrick, conductor Los Angeles & Salt Lake R. R.	D. L. Batchelor, Atchison, Topeka & Santa Fe Ry.
Oklahoma	F. E. Brannaman, assistant superintendent St. Louis-San Francisco R. R.	J. A. Demeke, St. Louis-San Francisco R. R.
Texas	F. J. Hawn Unattached.	E. R. Doss, Galveston, Harrisburg & San Antonio Ry.
California	V. S. Andrus, special inspector Southern Pacific Co.	J. N. Sherburne, Southern Pacific Co.
Idaho	Joel L. Priest, general agent Oregon Short Line R. R.	A. W. Griggs, Oregon Short Line R. R.
Montana	G. H. Jacobus, assistant to general superintendent Northern Pacific Ry.	W. J. Cregg, Northern Pacific Ry.
Nevada	W. M. Whitney Virginia & Truckee Ry.	J. F. Evans, Western Pacific R. R. Co.
Oregon	Fred Hansen, train master Southern Pacific Co.	Paul S. Treiber, O. W. R. R. & N. Co.
Utah	E. C. Manson, superintendent transportation Los Angeles & Salt Lake R. R.	T. J. Willems, Oregon Short Line R. R.
Washington	L. F. Newton, assistant to general superintendent Northern Pacific Ry.	James M. Ballingall, Spokane, Portland & Seattle Ry.

MORE CHINESE RAILWAY CONSTRUCTION.—A railway junction line about 10 miles long has been completed in China, connecting the Shanghai-Nanking Railway with the Shanghai-Hangchow-Ningpo Railway, the two railways hav-

ing terminals in north and south Shanghai, respectively, and forming with them a loop around Shanghai. This short line will be a convenience to the public and of considerable commercial and strategic importance.—Commerce Report.

# Operating Conditions Affecting Tonnage\*

## A Discussion of the Fundamental Principles Governing Train Loading. Measures to Secure Maximum Performance

PROBABLY the best measure of an operating man's success is his ability to make a high net train haul at a minimum expense for operation. The co-operation of all departments is required to obtain the desired results. Locomotives must be properly maintained, track must be kept up to standard, the fuel department, the water service department, the store department must all serve their purposes efficiently. The accounting department must furnish understandable statistics to aid the operating man in studying the results he is obtaining, and every other department must realize the magnitude and importance of the problem, and do its share toward aiding the operating department in its solution.

While a high net train haul is desirable, it does not always indicate economical operation. Engines may be loaded beyond their economical capacity. Time-freight and local trains may be so overloaded that poor service will result. In other words, a high net train haul at the expense of service or of economical operation is a detriment rather than a benefit to a road. Economy of operation is the desired goal, and in the final analysis, a tonnage showing made without due consideration of cost, and without taking into consideration the importance of proper service, will more often prove inefficient than otherwise. The problem is a broad one and must be so considered.

To obtain the desired results, tonnage ratings must be made that will insure the loading of engines to their full economical capacity for average conditions. In applying such a rating, stated reductions should be arranged for to take care of abnormal conditions, and such reductions should be authorized by local officials whenever necessary to insure uniform operation of trains.

The economical tonnage capacity of an engine from an operating standpoint will be decided in the final analysis by the time required for the engine to cover the division. Most authorities agree that an average speed of 10 miles per hour for dead freight trains on grades, with a minimum speed of 6 miles per hour on the hardest pulls is most economical. On level divisions, the rating should be such that an average speed of 15 to 18 miles per hour can be maintained. It has been demonstrated that any rating that slows an engine down so that more than two hours' overtime is made is a losing proposition. Overloaded trains move so slowly and uncertainly that despatchers cannot figure close meeting points. Quick moves cannot be made on busy track to advance such trains through other traffic. An excessive amount of power and equipment is necessary to move the business, while long hours on the road are hard on the crews and are conducive to engine failures, which play havoc with the tonnage showing.

It goes without saying that it is just as much an operating as a mechanical department problem to have power maintained in first-class condition, so that full tonnage capacity can be obtained from engines at all times; but, unfortunately, the financial condition of some roads does not permit the highest class of mechanical facilities to be furnished at all points. On some divisions or districts of such roads, facilities for making running repairs to locomotives are inadequate. Engines on these districts may have to be favored in order to get the most economical results. If such engines were allowed to haul five or ten per cent less than

the regular rating, they should be able to operate very satisfactorily until the improper conditions could be corrected. Such a tonnage reduction might prevent engine failures that would occur were an attempt made to haul full rating. The loss resulting from one or two engine failures a day, where engines are not maintained so that they can handle full rating, will be greater than the sacrifice of five or ten per cent of the rating if engine failures are thereby avoided. It is always better to err on the side of too light rather than too heavy a rating, because too heavy a rating will put power in the shop, cause engine failures, and disorganize train service quicker than any other known cause.

In moving traffic, the ideal condition, where the grade is uniform in both directions, would be to have an equal volume of business to be moved in each direction. Where the grade is heavier in one direction than in the other, the ideal condition would be where the volume of business to be moved in each direction is in proportion to the engine capacity. For example, on some eastern coal roads the grade from the mines to tidewater is such that an engine can handle as many loads eastbound as it can handle empties westbound. However, this ideal condition is seldom met in actual practice.

Where the tonnage does not balance in both directions, each engine should haul its full capacity in the direction of the volume of business and should be loaded with its proportion of the tonnage in the return direction. Thus, each engine will have a light train on its return trip. Such trains can make fast time and are easy for despatchers to handle, whereas, if full tonnage trains are made up in the direction of light business and one engine is given a full train, this train may slow up two or three light engines following it, and reduce the average speed of the return movement of all of the power on the district.

Experience and a knowledge of local operating conditions will be the only guides in determining the practical allowances which must at times be made for some of the hundred miscellaneous conditions that enter into the final determination of a practical tonnage rating figure for a district. Many times the analysis and correction, where possible, of one or more of the minor conditions which affect tonnage handling will give big and immediate returns.

It takes less power to haul a train over track which is laid with heavy steel, is well ballasted and is properly maintained than to haul the same tonnage over poor track. There is a tendency in track maintenance work to raise the elevation on curves. If this is not watched, the equivalent grade on hard pulls around such curves will be increased above normal, necessitating a reduction in the tonnage which trains can handle at such points. The location and the length of side tracks may have an influence on the practical tonnage rating for a district. If side tracks are so far apart that tonnage trains cannot be moved promptly through other traffic, the result will be that over-time will increase to such an extent that the tonnage will have to be reduced. On busy lines, if side tracks are so short that they will not hold full tonnage trains, the delays caused to other trains by "sawing by" may reach such a proportion that the tonnage rating will have to be reduced.

The distance between coal chutes and water tanks rather than the ruling grade may regulate the tonnage on some districts. If the location of a signal, side track, train order station, coal chute, or water tank requires that tonnage

\* Abstracted from the first of two papers on this subject soon to be issued in the course on Railroad Operation of the Railway Educational Bureau, Omaha, Nebr.  
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trains stop on some short hard pull, it may have an important bearing on the tonnage rating. Trains might be able to handle full tonnage past such a point if not required to stop, but the fact that a stop may be required at such a point often means the necessity of reducing the tonnage rating for the entire district; in fact, there are districts on some railroads where the rating is controlled entirely by the tonnage which engines can handle in pulling into and out of side tracks.

Other points that must be given proper consideration are the average condition of the power on a district, the efficiency of the enginemen, the quality of the train despatcher's work, the density of the traffic, the efficiency of local trains in handling short loads, the interference of work trains with regular traffic, the quality of the coal furnished the engines, etc. Another item of particular difficulty occurs in districts where there is water which contains impurities that cause it to foam. Another thing that must be considered is the general weather conditions on a district. On districts where there are high winds much of the time during the daylight hours, allowances may have to be made accordingly. On other districts through lowlands where the rails are damp and slippery at night, allowances must be made for that condition. In other words, a practical tonnage rating implies the consideration of every factor that influences the tonnage capacity of a locomotive, or it is not a practical tonnage rating.

The capacity of freight cars has shown a steady increase in the last few years, but in many cases the average loading per car has not increased in proportion to this increased capacity. This results in a tonnage loss due to the greater length of train the large engines must haul, as well as in an uneconomical use of the equipment, which in times of car shortage means unnecessary loss of business.

The men who handle car distribution, either in the car service office or under the different division superintendents, are the persons who can do the most to bring up carloading to a high standard by a careful distribution of cars of low capacity for light loading and of cars of heavy capacity where they can be loaded to full capacity. Missionary work among agents in regard to ordering cars of proper capacity for the loading offered is well paid for by the results that can be obtained. Certain classes of cars can often be assigned for special service with good results. Shippers in many cases are not careful to load cars to full capacity, but an agent who is tactful and energetic will be able to gain their co-operation in this matter.

Empty-car mileage is a necessary evil, but constant care should be exercised to keep it at a minimum. On most roads, the hardest empty haul to overcome is that of refrigerator, stock, ore, coal, coke and tank cars.

The handling of fast freight has perhaps a more marked effect on the tonnage showing of a road than any other factor. This freight must be handled in fast, scheduled trains which must be kept on time. In order to make the time, they must be run with light tonnage. As much as 20 or 25 per cent reduction may be necessary in extreme cases. The problem of giving satisfactory fast freight service and at the same time sacrificing as little tonnage as possible is a difficult one.

In most cases, a double daily time freight service, well organized and thoroughly understood by shippers and connecting lines, will be sufficient, providing trains are run on time on such schedules, and that additional sections of such trains are provided in case more business is offered than can be handled in one section. In order to make a double daily time-freight service satisfactory, scheduled trains must be run daily, or daily except Sunday. They must be started on time and must be kept on time. The importance of this is apparent when it is considered that service is almost the only inducement that a road can offer to obtain competitive freight. It is a fact that the road that moves its trains on

time and gives reliable service will get more business than a competing road which offers a slightly faster schedule but cannot be relied upon to maintain it.

Objection is often made to the holding of time freight for the length of time required where the service is on a double daily basis, but such objections are seldom well founded. Suppose a car of fruit is received from a connection too late to make the regular schedule time-freight train and is held over for 11 hours for the next schedule fast-freight train. Ninety-nine times out of 100, it will make better time to destination as a result of being held this 11 hours than it would make if it were forced out of the yard in some extra train, simply to avoid showing an 11-hour terminal delay on the car. Delivery at destination is what the shipper is concerned in, not intermediate movement, or the method of getting the car to destination promptly. The only sure method of getting time freight to destination promptly and properly is to keep it in time-freight trains on schedule time, other arguments to the contrary notwithstanding. It is a short-sighted policy to criticize terminal officials for apparent delays to fast freight at their terminal, when in reality there is no real delay, the time lost being merely the time elapsed between the receipt of the car and the leaving time of the first outbound scheduled fast-freight train. Where time freight is scattered through all of the extra trains, it is natural for yardmasters and conductors to take advantage of this fact and give such trains less than their full rating, calling them fast-freight trains, if criticized for their light tonnage.

Time-freight trains should always be made up at the terminal in district order, and when practical, in station order. Fill-outs for time freight trains at intermediate points should also be switched in district or station order, and cut into the train in such a manner as to leave it lined up properly. The only dead freight that should be hauled in a fast-freight train is that necessary to fill the train to proper tonnage in case not enough high-class freight is offered to fill the train. Such dead freight should be switched together so that it can be cut out and high-class freight substituted at intermediate terminals.

Cars containing fast freight should be carded with cards of distinctive marking, so that they will not be lost sight of. Manifests or waybills of special color should be used for such freight for the same purpose. It is sometimes permissible to move fast freight on card billing to avoid its missing its regular schedule train on account of the waybills not being ready.

It is just as important to have proper tonnage ratings for time-freight trains as for dead-freight trains. In order to arrive at the proper rating for such trains, tonnage tests should be made, preferably with a dynamometer car, and continued until a rating is arrived at that will allow the train to make its schedule regularly with the least possible sacrifice of tonnage. In making such tests, it will often be found that the distribution of time on the time table schedule of the train can be adjusted to advantage, with a corresponding possibility that the tonnage may be increased on the basis of the readjusted schedule.

Where special trains of fast freight, in addition to the regular schedules, are handled from time to time, special schedules and ratings should be worked out scientifically for such trains. For instance, there should be special schedules and special tonnage ratings for solid trains of stock, bananas, Asiatic freight, fruit, etc. Then when there is insufficient tonnage offered of the special commodity to be moved, such trains, when moving in the direction of the volume of business, can be filled out with other high-class freight or with dead freight to the special rating which it is known they can haul and make time with.

In order to keep fast freight trains on time even when they are properly loaded and scheduled, it is necessary that all concerned be educated in the handling of such trains to

keep them on time just as they must be educated to keep passenger trains on time. Terminal work must be organized so that when such trains arrive, each move is planned to insure the movement of the train through the terminal in the dead time allowed by the schedule. Crews of dead-freight trains must be taught to respect the schedules of fast-freight trains almost as much as though they were passenger trains, and despatchers must be convinced of the desire of the management to keep such trains on schedule. Experience has proved that time-freight trains can be run with the same regularity as passenger trains. Shippers are quick to discover the fact that a road is keeping its time-freight trains on time and to divert freight to such trains in order to take advantage of the regularity of the service.

With other conditions right for making a tonnage showing, the best results will not be obtained unless there is some system of showing the correct tonnage of cars on waybills. There is a tendency, which is only human, for some conductors to over-estimate weights so that they can make a fast run, and for some yardmasters to under-estimate weights so that they can clear their yard. In such cases, trains either stall and double hills, or else run light. The only method of correcting such conditions is to adopt some system which will insure the use of correct weights for tonnage purposes.

The first step in showing correct weights is to have all cars properly stenciled with their correct light or tare weight. The next step is to show scale weights of loaded cars on waybills wherever it is possible and to use such scale weights in figuring tonnage. Where it is not practical to have cars scale-weighed, estimated weights must be used. In many cases, estimated weights are in accordance with shippers' agreements, and such estimated weights are reliable; but in other cases, the estimate is guess work, pure and simple, unless information is furnished to agents to guide them in making their estimates.

Each agent should be furnished with a list showing the weights of the various commodities, which are ordinarily shipped under estimated weights. The weights of car-loads of grain can be figured by agents if they know the average weight per bushel of the various grains being shipped. Methods of estimating the weight of car-loads of lumber, telephone poles, etc., can be furnished for the use of agents. Numerous other schemes can be easily worked out so that, as the matter is followed up and the use of properly estimated weights insisted upon, there will be but little difference between estimated weights and actual weights.

A successful plan for getting the exact weight of the load in merchandise cars at freight houses is to have the weight clerks at the freight house keep their tonnages totaled. Then as each car is closed, a card can be tacked on the car, on which is shown the exact weight of the contents.

Where scale weights or association agreement weights are not shown on waybills, yardmasters and conductors should be required to handle cars for tonnage purposes on the basis of the light or tare weight stenciled on the car, plus the estimated weight of the contents, as shown on the waybill.

From a tonnage standpoint, as well as from a traffic and revenue standpoint, it is most desirable to have all cars move under actual scale weights. The loss of tonnage and revenue, which results from not having the actual weights of car-load shipments, will in many cases more than offset the investment necessary to provide track scales at important points for the purpose of scale-weighing cars.

If tonnage trains are expected to get over the road promptly, they must not be required to do switching and local work. If there are more local cars than the local train can handle, such cars should be switched together at the head end of some one extra train and that train run sufficiently light so that it can do this extra local work and still get over the road in a reasonable time.

Through trains should be made up at original terminals in district order as far as practicable. If there are junction

points or large stations where a number of loads must be set out, the "set-outs" should be switched together on the head or rear end of the train. The thought to be kept in mind is that yards are provided in which to do switching and that it is not expected that any unnecessary switching should be done between terminals. It should also be remembered that if one yard only half does the job, it means added work for all of the other yards through which the train passes. With a little more time and effort, the first yard could send the train out, switched in proper order, with a considerable net saving in time, considering the work which otherwise would have to be done at other terminals in handling this same train.

Through trains should not be stopped to pick up short loads. This should be the work of the local freight train, or if there is more work than the local can do, of some one of the extra trains which are run light for this purpose. It is, of course, perfectly proper to stop a train to pick up stock or perishable freight, and there are times when conditions are such that through trains may be stopped to pick up other freight; but it is very discouraging to a train crew when making a good run to have despatchers take advantage of the fact and stop them to do local work.

The loading and handling of local trains is a science in itself. Sufficient tonnage should be sacrificed on such trains to allow despatchers to figure on their moving quickly between stations. They should be made up in the yards to avoid unnecessary switching on the road in setting out cars. The pedler cars should be switched together so that they can all be worked with one spotting of the train at the station; and perhaps most important of all, the pedler cars themselves must be loaded at the freight house in station order, so that the train crews can find the freight for the different stations promptly, and unload it without first having to unload and then reload freight for other stations. It is very expensive to have local freight train crews doing stevedore work that should have been done at freight houses.

The success of any system depends on the net results obtained from its application. In order to insure successful handling of the tonnage situation on a railroad, there should be some system of reports in effect, that will keep local officials in touch with their daily averages and allow general officials to know that proper results are being obtained on the system. There are a number of methods of keeping in touch with the tonnage handled. On every road, the tonnage which trains are handling is shown on the train sheets. On some roads, the train sheet carries additional information about the tonnage performance and shows such performance as a percentage of the engine capacity. Again, there are daily reports compiled in the superintendent's office to give this same information.

Whatever the system used, there are two or three essential points on which information should be given, the first and most important of which is the percentage of the practical engine capacity that is being used in moving tonnage in the direction of the volume of business. If tonnage ratings have been made by practical tests for average conditions, and by these tests it has been found that the rating for a certain engine from one terminal to another 100 miles distant is 2,000 tons, and that it is practical to handle this tonnage under average conditions; then the engine's ton-mile capacity between those two terminals is 200,000 ton miles. If the conductor's wheel report shows that the actual ton miles handled only amounted to 150,000, there is a loss of 50,000 ton miles of engine capacity to be accounted for on such a trip. In other words, the engine was only used to 75 per cent of its efficiency from a tonnage capacity point of view. Statistics of this kind, if made up on a practical basis, are probably the most useful in checking tonnage results. They are only effective in the direction of the volume of business, and are only worth while if based on the actual practical ton-mile capacity of the engine.

## General News Department

The passenger car shop of the Southern Railway at Meridian, Miss., was destroyed by fire on the night of April 15; estimated loss, \$100,000.

A press despatch from Beaumont, Tex., says that the Gulf, Colorado & Santa Fe has been fined \$2,000 and costs for having two train despachters at work 12 hours each, daily, for ten days.

The Central of Georgia has granted to farmers, for use free of charge the coming summer, 3,775 acres of land along the railroad right of way; and announces that tracts aggregating 3,200 acres more are available.

Hale Holden, president of the Chicago, Burlington & Quincy, has written a letter to each of the 50,000 employees of the system, asking them to give their earnest attention to supporting the government through their present work, and by such individual efforts as they may deem necessary outside of their usual duties.

Instructions have been issued from the office of the president of the St. Louis-San Francisco to fly an American flag on each locomotive in service on the entire system. The stars and stripes, in addition, will be put on all station buildings along the line. Flags are to be furnished by the company, although it is stated that the idea originated with the employees themselves.

The Great Northern has issued bulletins to its employees stating that all of its men enlisting in the army and navy of the United States will have their positions restored to them upon returning from such service, and also that all seniority and pension rights will be retained. The Northern Pacific has issued similar bulletins from the office of the vice-president.

The Chicago, Rock Island & Pacific is going to furnish telegraphic reports of all major league baseball games on its important through passenger trains. The trains which will have the service include the Golden State Limited and the Californian between Chicago and California, the Rocky Mountain Limited, between Chicago and Colorado, and the Colorado Flyer, between Kansas City and Colorado.

On Saturday, April 21, a section of the new New York City Rapid Transit Lines, about 4½ miles long, will be opened for business. This line is three-track, elevated, extending from the Queens Borough bridge eastward to Alburtis avenue, Corona, L. I. It will be operated by the Interborough Rapid Transit Company. Trains from Corona will be run through, by way of the tunnel under the East river, to the Grand Central Terminal, Manhattan.

In court at Bentonville, Ark., April 13, a jury rendered a verdict for \$190,000 in favor of the Missouri & North Arkansas Railroad in the suit of that road against the Kansas City Southern for the amount of payments which had to be made in connection with the butting collision between a motor car of the Missouri & North Arkansas and a passenger train of the Kansas City Southern, near Tipton Ford, Mo., on August 5, 1914, when 40 persons were killed.

The Missouri, Kansas & Texas has reduced its telegraph service about 50 per cent, and has installed Morkrum printers between St. Louis, Mo.; Parsons, Kan., and Dallas, Tex., to handle the business between those points. The company has been using telephones for despaching trains for five years, and expects to install additional telephone equipment, as funds can be found for that purpose, until it has sufficient telephone circuits to handle all message work except the heavy loads between important offices, which will be handled by printers.

The city of Birmingham, Ala., has adopted a code of traffic regulations in which motor vehicles are required to be brought to a full stop before crossing a railroad track, except where there is a flagman who gives a signal of safety; but it does not appear that any active measures have as yet been taken to enforce the ordinance, the city police force being evidently inad-

equate to the purpose. Whenever a flagman gives a signal of danger, or when there is a flagman on duty and he gives no signal, it is unlawful for the motor vehicle to cross the tracks. At crossings where there is no flagman the person in charge of a motor vehicle is required not only to stop, but also to look and listen; and he must not cross or attempt to cross without knowing that the way is clear.

The annual election of the St. Louis Railway Club took place at the American Annex hotel, St. Louis, on April 13. The following officers were elected for the coming year: President, M. O'Brien, master mechanic, United Railways of St. Louis; first vice-president, W. S. Williams, division superintendent, Illinois Central, Chicago, Ill.; second vice-president, J. A. Somerville, general superintendent of transportation, Missouri Pacific-St. Louis, Iron Mountain & Southern; third vice-president, F. W. Green; secretary-treasurer, B. W. Frauenthal, ticket agent, Union Station, St. Louis. The principal address delivered at the meeting was by J. A. Somerville, on "The Freight Car Situation and Its Probable Solution." The secretary reported that the club showed a net increase in membership during the previous year of 136.

Results of the annual inspection of the track, roadway and stations of the Pacific system of the Southern Pacific made last fall were recently made public. The Sacramento division received the highest rating with a percentage of 92.72. B. Roland, roadmaster of the Suisun district of the western division, received the gold medal for the best roadmaster's district with a score of 96.04, and J. Mullen, foreman of Section No. 5 on the San Jose district of the coast division, received the gold medal for the best section, with a score of 98.20. Silver medals were awarded to the 48 section foremen having the best section on their roadmasters' districts, to 82 agents whose stations received perfect ratings, to the pumbers of 28 pumping stations for perfect pump houses, to 13 pumbers for perfect fuel oil plants and to 12 engineers for perfect power plants.

Through the efforts of the bureau of efficiency of the Northern Pacific, errors in the handling of l. c. l. freight were decreased 41 per cent during 1916, the first year the bureau was in existence. This showing was made in spite of an increase of nearly 40 per cent in the tonnage moved. Fred M. Metcalfe, head of the bureau, also reports a decrease of 37 per cent in injuries to passengers carried. Although the Northern Pacific added 32,774 employees to its payroll during the year, or an average of 2,761 each month, only 1 per cent of the entire number employed sustained injuries in their work, slight or otherwise. Injuries due to physical conditions and methods largely in the company's control were only 10 per cent of the total, or a decrease of 15 per cent under 1915. The remaining 90 per cent were chargeable to personal negligence. The bureau is carrying on a continuous campaign against carelessness, whether it be on the part of its employees, patrons, trespassers, civilians, or motorists.

At a meeting of railroad publicity representatives in Chicago on April 14, it was unanimously decided to offer their services to the government, subject to the approval of their respective executives. The publicity men believe that, because of their newspaper training and specialized experience, they are in a position to be of practical service to the government in the present crisis. It is proposed that at a meeting in Washington on April 24 a committee be named to call upon Fairfax Harrison, chairman of the American Railway Association's special committee on national defense, to offer the services of the publicity representatives, and furnish such details as may be desired. The following were present at this meeting: John Duffy, Lehigh Valley; Z. G. Hopkins, M. K. & T.; R. V. Cooper, C. B. & Q.; J. F. Jarrell, Santa Fe; Lauren Foreman, Southern; C. A. Stedman, Northern Pacific; J. A. Simpson, Rock Island; Mr. Klein, Wabash; Jack Estes, Cotton Belt; Ballard Dunn, Union Pacific; L. M. Harris, Frisco.

**Safety First on the B. & O.**

The Safety First Bureau of the Baltimore & Ohio reports a slight decrease in the number of employees injured during 1916 as compared with 1915. J. T. Broderick, supervisor of special bureaus of the Baltimore & Ohio, shows the methods undertaken during the year to reduce the list of accidents. There were held last year 198 safety meetings at which 8,268 suggestions were made by the men. Of these, 7,854 or 91 per cent were adopted; 411 or 5 per cent were rejected as unnecessary; and 363 or 4 per cent are now under consideration. There was a decrease of 8,372 or 49 per cent in the number of suggestions submitted as compared with 1915. The motion picture, "The House That Jack Built," was shown at all important terminals on the system. In addition, 41 public safety meetings were conducted at which lectures with stereopticon slides were given to illustrate unsafe practices. The illustrated weekly bulletins of the National Safety Council were distributed and posted in the shops, and a book of safety and sanitation rules was issued for the Government of employees.

The Safety Bureau helped to fit up the Government's safety first train and equipped a car for the use of the Ohio Industrial Commission in that State. Special safety exhibitions were installed at New York, Philadelphia, Pittsburgh, Baltimore and Detroit.

**Estimates for a Hudson River Wagon-Road Tunnel**

The Public Service Corporation of New Jersey, operating city and interurban electric railways in Jersey City, Newark and other places, has been considering plans for extending its interests across the Hudson river to New York City by means of a tunnel; and, according to Thomas N. McCarter, president of the corporation, in a statement made before the Newark Board of Trade, such a project has elements of reasonableness. The thing contemplated is a tunnel for motor trucks.

Mr. McCarter estimates that a tunnel, from near Twelfth street in Jersey City to Canal street, Manhattan, could be built for about \$10,000,000. Such a tunnel would be about two miles long, and about one mile of it would be beneath the river. The ruling grades would be less than three per cent. The statement says that last year the ferries between Manhattan and New Jersey points carried 6,130,945 vehicles, of which about one-half were on the ferries of the Pennsylvania, the Erie and the Lackawanna railroads. The average fare paid by these vehicles on the boats was 27½ cents each. It is estimated that by 1920 the railroad ferries referred to will be called upon to carry about 4,000,000 vehicles yearly; and as a tunnel would save for them considerable time, it is calculated that a charge of 35 cents a trip could be made. It is estimated that by 1920 not less than 60 per cent of the freight wagons in use in this territory will be motor driven.

Mr. McCarter's statement is based on the results of studies made by William H. Burr, Ralph Modjeski and Daniel E. Moran. They calculated that motor vehicles would run at 10 miles an hour and go through the tunnel in about 11 minutes, and it is estimated that 2,000,000 of them would use the tunnel the first year. At this rate, and calculating the hourly fluctuations according to the actual present traffic over the five principal ferries, the average distance between vehicles following one another through the tunnel would be, in the busiest hour of the day (8 to 9 a. m.), 189 feet.

The officers of the Public Service Corporation hope that a tunnel will be built by the states or counties, or at least with public money; but if this should not come to pass they might, at some later date, consider construction by the Public Service Corporation.

**Academic Discussions in Time of War**

Certain persons who object to any increase in freight rates and who style themselves a "Utility Bureau," have sent to President Wilson a protest claiming error or deception in the petitions which have been presented by the railroads. Replying to the claims made, George D. Dixon, vice-president of the Pennsylvania, says:

"The trustees of the Utilities Bureau seemingly desire the public to think that the railroads have failed to disclose the grounds upon which they base the justice of their appeal for higher rates. The facts are that the railroads' case rests upon

conditions known to everyone, and these conditions exist at this very moment. We are face to face not with a theory, but with a situation that must be met and dealt with promptly.

"In the last two years the prices of everything, from raw materials to wages, that enters into the cost of rendering transportation service, have enormously advanced. The price received by the railroads for giving the service has practically stood still. Transportation is today the only commodity of great importance that is being sold on a peace basis in this country, and the railroads are paying war prices for everything they buy. A fifteen per cent advance in rates, instead of being excessive, will only partly meet the increased cost that must be faced. The railroad situation and the military needs of the country are not matters concerning which we, as a nation, can afford to indulge in academic discussions. We are face to face with hard facts, possibly the hardest in our history, and we ought to govern ourselves accordingly."

Mr. Dixon estimates that his road will have a gross increase in receipts of \$22,000,000 annually if the Interstate Commerce Commission grants all the freight rate increases asked for; but expenses for this year will probably be \$30,000,000 more than last year, leaving net earnings at least \$8,000,000 less in 1917 than in 1916. He said that the Federal Government had taken a hand in the operation of the railroads, with the result that the company's rolling stock is not earning its maximum at all times, because it is in use on other railroads.

Higher wages in other industries had cost the railroads many thousands of dollars because of the inefficiency of labor. The company usually hired 30,000 laborers annually to take the place of men who quit, but this year it has been compelled to hire new laborers at the rate of 125,000 annually. The importation of Mexicans has not solved the labor problem. The fuel supply problem has become so acute that the company is daily confiscating coal along its lines to move trains.

The Government has asked the Pennsylvania Railroad Company to aid in carrying coal from the West Virginia coal fields to the Pacific Coast, to supply the battleships that will coal at Pacific ports. This the company will do; but it will entail a large number of its freight cars being out of service for the normal traffic.

**No R. S. M. A. Convention This Year**

E. H. Walker, president of the Railway Supply Manufacturers' Association on April 18 announced to the members that the convention of that association, which was to have been held at Atlantic City, N. J., June 13 to 20, has been postponed for one year.

Continuing, Mr. Walker's announcement reads:

"The unanimity of opinion among our members that we should, as patriotic citizens, conserve our time and resources, holding them subject to the call of our country's necessities, impels this action.

"The probability is, from the best information I have been able to obtain, that the two railroad associations with which we are allied, will not hold their conventions this year, and, if held, it will be in such limited time, with limited attendance, and at such place (not necessarily Atlantic City) as the exigencies warrant.

"Anticipating the possibility and the probability of the necessity for this decision, your president some time ago stopped all work on exhibition preparation, and while, necessarily, some money has been spent, we are not financially obligated as in normal years, when at this date the major portion of our expense is incurred. . . ."

**Railway Development Association**

The annual convention of the Railway Development Association will take place at Louisville, Ky., on May 9, 10 and 11. In addition to the regular program, which includes addresses to be delivered by invited speakers, one afternoon will be devoted to a survey of the industrial and agricultural resources of the city and adjacent territory. Some of the larger manufacturing plants will be visited, and the physical advantages offered by Louisville in an industrial way will be studied. The survey will also be extended to the immediate territory devoted to potato and onion growing, and to market gardening.

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1917

Name of road.	Average mileage operated during period.			Operating revenues—			Maintenance of equipment.			Operating expenses—			Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) comp. with last year.		
	Freight.	Pasenger.	Total	Traffic.	Trans- portation.	Mis- cellaneous.	General.	Total.										
Atlantic City	\$61,725	\$55,870	\$127,552	\$26,285	\$17,974	\$3,398	\$97,350	\$84	\$15,793	\$18,740	\$10,000	\$28,805	\$14,402	-\$14,402				
Bangor & Aroostook	632	48,862	59,920	59,532	58,886	3,780	12,575	12,575	15,000	75,728	30,000	60,726	39,897	-39,897				
Central of Georgia	1,919	741,048	266,882	1,133,566	163,886	200,576	39,772	39,966	41,512	835,438	1,720,795	61,342	235,776	13,377				
Chicago & Eastern Illinois	1,131	1,004,777	1,476,334	1,476,334	108,186	365,968	27,979	1,183,344	1,183,344	292,990	1,082,052	62,500	230,184	-26,284				
Minneapolis & St. Louis	1,647	506,884	109,728	666,956	102,761	38,902	17,051	322,806	17,051	164,639	164,639	120,903	120,903	-106,534	-106,534			
New Orleans & Northeastern	204	355,133	54,034	368,951	37,081	61,968	11,799	12,386	12,386	251,428	1,269,428	10,000	88,822	6,616				
Philadelphia & Reading	1,127	3,671,618	516,529	4,502,835	256,853	760,737	44,710	2,077,923	13,387	3,233,427	1,269,428	138,922	1,129,726	-563,305				
Pittsburgh, Shawmut & Northern	205	92,261	5,364	99,736	12,163	45,946	1,328	43,185	43,185	1,739	7,359	1,779	9,138	-54,277				
Port Reading	21	104,630	.....	120,271	9,733	8,660	39	94,042	134	112,604	7,668	10,000	2,332	-42,753				
Two Months of CALENDAR YEAR, 1917																		
Atlantic City	170	\$132,703	\$116,305	\$266,707	\$52,749	\$24,649	\$5,781	\$206,722	\$188	\$1,778	\$291,756	-\$23,029	\$20,000	-\$43,104	-\$4,178			
Bangor & Aroostook	632	619,762	104,665	761,137	2,331,944	341,985	115,458	77,110	72,688	24,216	526,032	23,105	30,000	205,102	-5,306			
Central of Georgia	1,919	1,501,027	56,968	1,557,995	3,092,015	264,831	421,601	82,535	79,746	32,222	80,842	1,720,795	611,149	492,913	54,214			
Chicago & Eastern Illinois	1,131	2,348,530	518,961	2,867,491	1,081,186	385,030	187,553	1,234,098	21,145	78,855	2,459,026	632,989	123,500	509,019	-3,126			
Minneapolis & St. Louis	1,647	1,154,351	266,059	1,540,515	200,892	37,854	682,322	173	45,668	1,154,568	385,946	87,076	298,761	-177,938	-177,938			
Missouri & North Arkansas	365	156,898	61,282	233,587	39,805	31,251	7,853	82,184	82,184	10,389	171,482	62,105	9,600	52,301	80,642			
Missouri, Kansas & Texas System	3865	4,496,665	1,496,665	6,426,629	1,362,621	1,064,024	9,551	148,579	148,579	42,360	217,725	88,301	255,396	590,900	521,965			
Missouri, Oklahoma & Gulf	334	263,373	41,244	317,165	35,045	55,824	3,693	32,885	32,885	14,968	264,633	52,332	14,925	37,603	86,887			
Missouri, Oklahoma & Gulf of Texas	134	511,858	751	530,592	6,640	50,516	2,182,74	21,284	21,284	3,656	43,395	367	9,288	11,611	216,010			
Missouri Pacific	3,915	4,084,659	776,156	5,234,072	801,426	930,516	134,274	2,182,74	2,182,74	126,617	4,171,656	1,152,416	228,000	922,209	216,010			
Mobile & Ohio	1,160	1,707,806	226,331	2,060,281	244,378	449,354	78,383	704,714	4,899	62,817	1,544,547	515,234	80,970	434,247	51,029			
Monongahela Connecting	108	294,590	19,287	319,687	41,074	29,913	1,768	85,701	85,701	8,011	166,467	15,220	141,220	-10,728	-10,728			
Pex. R. R. & S. Co.	6	677,141	222,915	970,626	95,447	322,273	39,778	688	126,996	4,847	23,009	90,264	8,683	72,815	235,759			
Nashville, Chattanooga & St. Louis	1,237	1,545,178	509,040	2,298,310	243,435	424,452	109,583	889,784	889,784	29,377	73,826	1,769,620	528,590	60,000	467,599	-2,725		
Nevada Northern	165	315,958	33,464	347,226	30,995	32,958	1,553	65,541	65,541	17,533	9,140	140,351	16,000	190,874	32,347			
New Orleans & Northeastern	204	560,958	106,436	763,350	66,403	22,159	12,635	243,806	243,806	12,923	164,344	29,300	211,116	64,445	45,199			
New Orleans, Texas & Mexico	191	171,847	47,340	228,841	32,644,774	3,399,367	6,488,766	508,828	14,419,278	14,419,278	550,093	26,210,965	6,442,809	1,762,430	-4,801,998	-228,235		
New York, Central Railroad	570	2,291,901	177,433	2,498,152	220,109	377,120	92,327	1,323,866	1,323,866	8,777	60,614	2,082,657	415,495	100,000	315,493	-156,901		
New York, Chicago & St. Louis	2,307	2,908,000	8,299,398	867,692	9,489,497	841,475	1,621,462	126,461	2,795,609	18,775	11,377	183,799	5,576,065	3,913,432	460,000	-156,901		
New York, New Haven & Hartford	1,988	5,915,248	4,821,627	12,446,566	1,069,161	1,819,633	74,532	561,678	561,678	192,595	384,502	9,150,630	3,285,936	550,000	2,735,703	116,897		
New York, Ontario & Western	204	833,283	145,012	978,305	1,186,637	121,425	217,722	17,255	567,592	9,923	37,370	961,333	255,303	36,000	159,299	-11,121		
New York, Susquehanna & Western	112	626,859	757,982	222,245	81,999	757,982	141,598	9,340	134,199	9,923	25,504	582,535	175,447	32,333	77,333	-27,922		
Norfolk & Western	140	396,455	92,824	500,564	44,130	70,271	3,732	317,923	317,923	11,243,673	1,243,673	71,133	156,085	2,485,390	1,44,041	286,820	1,166,765	
Norfolk Southern	6,514	8,201,900	7,800,899	32,644,774	3,399,367	6,488,766	1,621,462	126,461	2,795,609	18,775	12,923	183,799	5,576,065	3,913,432	460,000	-156,901		
Northwestern Pacific	507	1,207,082	41,808	190,950	1,081,186	177,433	217,722	17,364	561,678	1,075	239,365	1,34,344	20,030	4,652,121	845,858	37,733,077	35,235	
Oahu Railway & Land Co.	114	129,082	1,207,082	1,207,082	1,207,082	1,207,082	1,207,082	1,207,082	1,207,082	1,207,082	1,207,082	1,207,082	1,207,082	1,207,082	1,207,082	1,207,082		
Oregon Short Line	2,307	2,908,000	3,999,431	417,504	527,936	71,400	1,243,673	71,400	1,243,673	8,833	104,367	287,812	8,697,534	1,719,468	464,961	1,234,106	-819,481	
Oregon-Washington R. R. & Nav. Co.	6,514	8,029,086	1,111,837	9,859,277	1,050,660	347,158	90,745	1,050,660	39,519	147,313	283,427	26,788	178,877	3,190,421	1,237,111	33,222	-42,519	
Panhandle & Santa Fe	718	2,051,363	1,727,713	3,478,080	1,392,674	609,581	846,551	8,376	269,215	1,050,660	39,519	111,345	387,928	128,048	359,880	18,956	359,880	
Pennsylvania Railroad	1,955	6,890,419	1,890,411	8,780,430	1,273,561	2,183,203	169,127	5,501,118	88,212	297,004	9,506,385	251,944	696,774	288,040	696,774	-2,42,984	-2,42,984	
Pete Marquette	4,536	24,933,394	7,143,942	35,823,235	4,833,331	7,6,592	420,986	420,986	420,986	604,367	1,04,367	1,036,820	30,089,820	5,714,166	1,51,349	4,213,708	-2,66,956	-2,66,956
Philadelphia & Reading	1,127	8,029,086	1,111,837	9,859,277	1,050,660	347,158	90,745	1,050,660	39,519	147,313	283,427	26,788	178,877	3,190,421	1,237,111	33,222	-42,519	
Richmond, Frederickburg & Potowmac	88	345,024	28,731	604,182	175,433	1,322,510	3,489,522	429,462	326,036	1,232,036	9,730	251,944	8,697,534	1,719,468	464,961	1,234,106	-819,481	
Rutland	468	347,665	10,477,002	1,94,555	1,04,555	1,165,23	2,224,635	196,650	4,245,425	1,04,367	104,367	1,04,367	1,036,820	30,089,820	5,714,166	1,66,437	181,230	-592,973
St. Joseph & Grand Island	258	5,868,142	47,112	338,259	62,599	42,270	1,059,210	1,059,210	13,133	129,198	485	9,831	253,515	84,744	17,659	66,956	66,956	
St. Louis-San Francisco Company	4,752	8,149,733	2,021,773	8,383,963	1,059,228	97,173	1,289,782	1,289,782	1,289,782	1,289,782	1,289,782	1,289,782	1,289,782	1,289,782	1,289,782	1,289,782	1,289,782	
St. Louis, Brownsville & Mexican	4,539	8,149,733	3,09,323	8,149,733	1,322,510	3,489,522	429,462	326,036	1,232,036	9,730	251,944	8,697,534	1,719,468	464,961				

## MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

- AIR BRAKE ASSOCIATION.**—F. M. Nellis, Room 3014, 165 Broadway, New York City. Next annual convention, May 1-4, 1917, Hotel Chisca, Memphis, Tenn.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.**—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, July 18, 1917, Asheville, N. C.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.**—R. O. Wells, Illinois Central, Chicago, Ill. Next meeting, June, 1917, Denver.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Next meeting, June 13-20, Atlantic City, N. J.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.**—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.**—Calvin W. Rice, 29 W. 39th St., New York. Next convention, May 21-24, Cincinnati, Ohio.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.**—E. R. Woodson, Rooms 1116-8 Woodward Bldg., Washington, D. C. Annual meeting, May 30, 1917, Hotel Jefferson, Richmond, Va.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.**—Willis H. Failing, Terminal Station, Central of New Jersey, Jersey City, N. J. Next meeting, May, 1917, Cincinnati, Ohio.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.**—W. L. Connelly, Superintendent of Telegraph, Indiana Harbor Belt, Gibson, Ind. Next meeting, April 19, La Salle Hotel, Chicago.
- CANADIAN RAILWAY CLUB.**—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.**—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.**—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.
- CENTRAL RAILWAY CLUB.**—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual dinner, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
- CINCINNATI RAILWAY CLUB.**—H. Boutet, Chief Interchange Inspector, Cin'ti Ry., 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.**—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.
- FREIGHT CLAIM ASSOCIATION.**—Warren P. Taylor, Traffic Manager, R. F. & P., Richmond, Va. Annual convention, June 19, Chicago, Ill.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.**—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.**—J. G. Crawford, C. B. & Q. R. R., 702 E. 51st St., Chicago. Next meeting, May 14-17, Hotel Sherman, Chicago.
- MASTER BOILERMAKERS' ASSOCIATION.**—Harry D. Vought, 95 Liberty St., New York. Annual convention, May 22-25, Hotel Jefferson, Richmond, Va.
- MASTER CAR BUILDERS' ASSOCIATION.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Next meeting, June 13-20, Atlantic City, N. J.
- NEW ENGLAND RAILROAD CLUB.**—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.
- NEW YORK RAILROAD CLUB.**—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.**—Geo. A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.
- PACIFIC RAILWAY CLUB.**—W. S. Wollner, Assistant to Chief Engineer, Northwestern Pacific R. R., San Francisco, Cal.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.**—F. C. Stewart, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.
- RAILROAD CLUB OF KANSAS CITY.**—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.
- RAILWAY CLUB OF PITTSBURGH.**—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Pittsburgh Commercial Club Rooms, Colonial Annex Hotel, Pittsburgh.
- RAILWAY DEVELOPMENT ASSOCIATION.**—D. C. Welty, Commissioner of Agriculture, St. L., Iron Mt. & So., 1047 Railway Exchange Bldg., St. Louis. Annual meeting, May 9-11, Louisville, Ky.
- RAILWAY SIGNAL ASSOCIATION.**—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Next meeting, June 12-13, Hotel McAlpin, N. Y.
- RAILWAY STOREKEEPERS' ASSOCIATION.**—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio. Annual convention, May 21-23, Hotel Sherman, Chicago.
- RICHMOND RAILROAD CLUB.**—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.
- ST. LOUIS RAILWAY CLUB.**—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.**—A. J. Merrill, Grand Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 a. m., Piedmont Hotel, Atlanta.
- TRAFFIC CLUB OF CHICAGO.**—W. H. Wharton, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEW YORK.**—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.**—J. F. Mackie, 7122 Stewart Ave., Chicago. Next meeting, June 19, Fresno, Cal.
- UTAH SOCIETY OF ENGINEERS.**—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.
- WESTERN CANADA RAILWAY CLUB.**—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Monday in month, except June, July and August, Hotel Sherman, Chicago.

## Traffic News

The Erie Canal is to be opened for navigation on May 15.

The Railway Club of Rochester, N. Y., has chosen for president for the ensuing year M. P. Howell, general agent of the Lehigh Valley. The secretary is O. L. Dayharsch.

A hearing on the application of the railroads of Illinois before the Public Utilities Commission of that state for an intrastate passenger rate of 2.4 cents, which was suspended in December, was continued from April 13 to April 27.

The Central of New Jersey announces that it does not expect to run steamers the coming summer between Manhattan, New York City, and Atlantic Highlands. This water trip of about twenty miles has for many years been an adjunct to the railroad service from Atlantic Highlands, N. J., southward to Long Branch and beyond.

A press despatch from Portland, Ore., says that the railroads, at the request of the Government, have agreed to see that wheat shall be carried from the Pacific northwest to the Atlantic seaboard, for export, during the next two months, at the rate of at least 100 carloads a day. Grain dealers at Minneapolis, Minn., propose to call on the War Department to take whatever action may be necessary to secure the prompt movement eastward of 25,000,000 bushels of grain now stored in that city. It is said that substantially all of this grain is sold, part of it to go to Europe and part for domestic consumption.

The New York, New Haven & Hartford and the Pennsylvania announce that, beginning April 30, a second through passenger train will be run daily between Boston and Washington over the Hell Gate bridge route. Trains will leave either terminal at about 8 a. m. and run through in about twelve hours. Beginning June 11, a third train will run over this route six days in the week. It will be run between Washington and Bar Harbor, Me. Northbound, this train will leave Washington at 1:15 p. m., and southbound it will leave Bar Harbor at 3 p. m. The running time will be a little less than 24 hours.

The Chicago & Alton recently put into effect its spring and summer time table, containing several important changes in train service. The Chicago-St. Louis night trains, leaving the respective cities at 9 p. m. and midnight, have been relieved of way business and are now operated as strictly through trains. The "Nightingale," which formerly left Chicago at 10:30 p. m. for Kansas City, now leaves at 11 p. m. and has been provided with new Pullman cars. In the opposite direction the "Nightingale" will leave Kansas City at 9:45 p. m., arriving at Chicago at 11:20, making only five intermediate stops en route. The "Alton Limited" day trains, Nos. 1 and 2, between Chicago and St. Louis, have been provided with new cars from the Pullman shops and additional parlor cars. There are three parlor cars in each train. In addition, cafe, lounging and observation cars have been added to the new trains.

Railroad officers in the Twin Cities appeared last week before the senate committee on railroads of the Minnesota legislature, to favor the passage of a bill increasing the intrastate passenger rate from 2 to 2.4 cents a mile. E. C. Lindley, vice-president and general counsel of the Great Northern, estimated that the expenditures of the road this year based on the same operations as last year would be nearly \$13,000,000 more than in 1916. He estimated that the Adamson law and other wage increases during 1917 would cost the Great Northern \$2,850,000 additional; that fuel expenditures would surpass 1916 by \$3,500,000, supplies would cost \$5,000,000 more, equipment would reach \$1,000,000 more, and taxes would exceed those of 1916 by \$500,000. The countrywide congestion of traffic for several months past, he said, evidences the fact that transportation facilities are inadequate. If the commercial needs of the country are to be met by the carriers, the carriers must have sufficient revenue to acquire additional facilities and equipment. J. G. Woodworth, vice-president of the Northern Pacific, estimated that the increased expenses of his road would amount to approximately \$11,000,000 this year over 1916.

**Car Situation in West Not Improving**

Although western terminals, with the possible exception of Detroit, are not suffering from car congestion as they did during the past winter, traffic conditions are not improving as fast as was generally expected. In fact, during the past ten days there seems to have been a slight turn for the worse. The New York Central, the New York, Chicago & St. Louis and the Pere Marquette have made their embargoes against eastbound freight originating west of the Illinois-Indiana state line more severe, and the other eastern lines are also accepting less freight for eastern destinations than some time ago. The Wabash has embargoed all c. l. freight from connections destined for points in Detroit proper, except when billed for delivery to industries on Wabash private sidings. The Wabash has also placed an embargo on all c. l. freight from connections destined beyond Detroit and routed via the Michigan Central and Grand Trunk. Western grain shippers complain that, despite the pressure that they have brought to bear upon the Interstate Commerce Commission and the Car Service Commission of the American Railway Association, they are receiving no more cars than during the winter; that their elevators are full, and that they cannot get cars to ship to the seaboard where they have vessels waiting for them. Although traffic is not moving freely to the East, there is no large accumulation of cars in the Chicago switching district because of the embargoes, as was the case during the winter. Chicago operating officers maintain that they have no great difficulty in making deliveries from one road to another in the Chicago district.

Traffic in New England seems to be still badly congested. The Delaware & Hudson has an embargo on all freight destined for the Boston & Maine, with the exception of coal and the other usual exceptions. The New York, New Haven & Hartford will accept no l. c. l. freight from connections destined or consigned to Middleboro, Mass.; Worcester, Mass.; Plainville, Conn.; Bridgeport or New Haven, Conn. Labor troubles and weather conditions are assigned as the reasons for the embargo.

Westbound conditions seem to be no more encouraging than eastbound. The New York Central has an embargo on all freight from connections aside from the Boston & Maine, destined to points west of Ashtabula, Ohio, and Clearfield, Pa. The Lehigh Valley has an embargo on westbound freight via the Lehigh Valley Transportation Company consigned or to be consigned for holding at Buffalo, Chicago and Milwaukee. It also has an embargo on cement, slate, structural steel, copra oil, palm kernel oil, peanut oil and soya bean or olive oil, from all points to all destinations, and via the Lehigh Valley Transportation Company, except that cement may be accepted under certain conditions. The Pennsylvania Lines West have an embargo on freight from all points routed via the Pennsylvania company, destined to points on or via foreign lines when such shipments require transfer through transfer houses of the Pennsylvania company. The embargo does not apply to perishable freight and shipments to be used by the United States Government.

Car service officers in the West are divided in their opinions of the new car service rules which went into effect the latter part of February. Some of the western roads have suffered a reduction in the percentage of ownership of cars which they have on their lines, while others have been holding their own.

The general opinion seems to be that the eastern lines are not returning cars to the home roads. Some car service officers take a philosophical view of the situation. They say that the great trend of traffic is towards the East, and that to one car received from the East two cars are ready for shipment back, with the natural result that western roads do not show a gain in their percentage of ownership. Other railway officers believe that the rules are ineffective, and should be strengthened by making the penalty for diversion more severe and increasing the per diem rate. A view which seems to be gaining weight among railway officers is that no effective rules can be perfected recognizing the ownership of equipment, which will insure an equitable distribution of cars to correspond with the number of cars owned by each road. The demand for cars at the present time is greater than the supply, and every railway employee who has anything to do with the movement of cars has a strong incentive to violate the rules if substantial advantages will accrue thereby.

**Commission and Court News****INTERSTATE COMMERCE COMMISSION**

The commission has suspended until August 8 increased rates on live stock to Sioux City, Ia., filed by the Chicago, Milwaukee & St. Paul.

The commission has postponed until further orders the effective date of the partial code of car service rules prescribed in its order of January 18.

The commission has suspended until August 16 increased rates on petroleum and petroleum products from Kansas producing points to various Oklahoma destinations.

The commission has suspended until August 13 proposed increases in rates on ground iron ore from Chattanooga, Tenn., and points taking the same rates to New York, Boston and other eastern destinations.

The commission has further suspended until October 20 a tariff of the Old Dominion Steamship Company providing for the withdrawal of through commodity rates on cotton from Norfolk, Pinners Point and Portsmouth, Va., to various interior New England points.

The commission has suspended until August 13 demurrage tariffs filed by the eastern railroads proposing a reduction in the free time allowance on bituminous coal and coke from various producing districts to lake ports for trans-shipment by vessel. Under the present rule five days' free time is allowed. The proposed allowance is four days.

The commission has suspended until August 10 the proposed cancellation of commodity rates applicable on iron and steel wire goods from New England shipping points to points in Central Freight Association territory. The proposed application of fourth class rates for less than carload lots, and fifth class rates for carloads, will result in increases ranging from 19 per cent to 43 per cent.

The commission has given the railroads permission to put into effect on May 1 the proposed new demurrage rules, agreed on by the A. R. A. Committee on Relations between Railroads and the National Industrial Traffic League, giving five days' notice. The new rules provide for a charge of \$2 per car per day after the expiration of free time for the first five days, and \$5 for each succeeding day.

The commission has announced that hearings in the general investigation of the southeastern rate adjustments have been scheduled at Atlanta, Ga., on May 24, and at Atlantic City, N. J., on July 15. Further hearings at Montgomery, Ala.; Memphis and Nashville, Tenn., and Cincinnati, Ohio, will be held in the early fall. The aim of the commission is to so distribute the hearings as to enable all interested communities, commercial bodies and shippers to be heard at points reasonably convenient to them.

The commission has suspended until August 14 tariffs filed on behalf of the transcontinental railroads increasing commodity rates on centrifugal cream separators to Pacific Coast terminals and intermediate points. The present rate to Pacific Coast terminals is \$1.15, and the proposed rate is \$1.50 per 100 pounds. The commission also suspended until August 14 the proposed cancellation of a commodity rate of \$1.10 on window shades and window shade cloth and holland in straight or mixed carloads with window shade fixtures to Pacific Coast terminals. Under the proposed revision of the tariffs window shades and cloth would be subject to a less-than-carload commodity rate of \$2.20.

**Rates on Grain to Cairo, Ill.**

*Memphis Merchants Exchange et al. v. Illinois Central et al.  
Opinion by Commissioner Clements..*

It is alleged that defendants maintain rates on grain and grain products to and through Cairo, Ill., which unjustly discriminate against grain dealers at Evansville, Ind., Henderson, Ky., and Memphis, Tenn., on shipments from points in Illinois to

southeastern, Carolina, and Mississippi Valley territories. The commission holds that the discrimination disclosed arises from the failure of defendants to collect their published rates on interstate shipments through Cairo to the destination points involved; and that the mere maintenance of lower rates on intrastate than on interstate shipments does not require a finding by this commission that would be warrant to defendants to increase their intrastate rates. (43 I. C. C., 378.)

#### Western Trunk Line Increases

##### *Opinion by Commissioner McChord:*

The commission finds that the carriers have justified a proposed increased minimum weight on acids in tank cars to shell capacity of tank; proposed cancellations of commodity rates on agricultural implements in carloads, of commodity rates on burlap press cloth, any quantity, of certain commodity rates on candy, any quantity, and of certain commodity rates on grapes in carloads; a proposed change in description of heating apparatus taking commodity rates; and proposed increased rates on hollow building blocks and hollow building tile in carloads, on soda and soda products in carloads and, on stone in carloads and a proposed redescription of wrapping paper in carloads and increased commodity rates resulting therefrom.

The carriers have justified a cancellation of proportional rates on asphalt and asphaltum to Missouri River cities and related points, but not proposed increased local rates to Missouri River cities and proposed increased local and proportional rates to interior Iowa cities. They have not justified increased rates on building and roofing material in carloads and rates on chip board in carloads; proposed increased carload minima on cooperation and proposed elimination of two for one rule, and a proposed cancellation of commodity rates on toilet paper, in straight carloads, is found justified but a proposed cancellation of such rates on toilet paper, in mixed carload shipments with unprinted papers, not justified.

While the proposed changes cover a wide territory and increase the rates on many different commodities, the carriers offered no general reason or justification such as the need of additional revenue in support of the changes as a whole. They relied on evidence of special circumstances and conditions surrounding each commodity or group of commodities. (43 I. C. C., 481.)

#### PERSONNEL OF COMMISSIONS

William L. Ransom has been appointed counsel to the New York State Public Service Commission, First district; salary, \$10,000. Mr. Ransom hitherto has been a justice of the city court, New York City, at a salary of \$12,000.

#### COURT NEWS

##### Negative Testimony as to Hearing Warnings

In an action for damages for the death of a man killed at a private crossing there was affirmative testimony that warnings were given by the whistle and bell. The plaintiff's only witness, admitting that he was busily engaged at the time, stated that he did not hear any bell. The Pennsylvania Supreme Court held that this negative testimony was insufficient to overcome that of the defendant's witnesses, and a judgment for the defendant notwithstanding a verdict for the plaintiff was proper.—Kubrak v. Pennsylvania (Pa.), 100 Atl., 94. Decided January 8, 1917.

##### Assessments—"Railroad Line" Does Not Include Spurs

Suit was brought by a railroad company to test the question whether the expression "railroad lines" in a statute authorizing the levy of a local contribution "per mile of railroad line" included other than the main line. The Louisiana Supreme Court held that the statute contemplated an assessment only of mileage of main line or of tracks not used exclusively as side tracks, and did not include in the computation tracks used wholly as side tracks; but a branch road operated as such, or even a freight spur, if open to public use, is a "railroad line."

The mere fact that the railroad paid taxes in several former years exactly on the same basis as those for the contested assessment did not estop it from questioning the assessment; though it might be good ground for the assessing board to return

the amount thus paid when not due.—Morgan's Louisiana & Texas v. Ancoin (La.), 73 So., 859. Decided January 15, 1917.

##### Apportionment of Expense of Change in Crossing

The Connecticut Supreme Court of Errors holds that the statute providing for the apportionment of "the expense of any change ordered" upon a crossing among the railroad, the municipality, and any street railway using or having power to use the street, means all necessary expense incurred by the railroad in putting the crossing in practicable condition for use by the railroad and by the municipality, and hence inferentially includes the expense of equipping a bridge with rails, etc.—N. Y. N. H. & H. v. Town of Orange (Conn.), 100 Atl., 25. Decided February 21, 1917.

##### Liability for Spurious Bills of Lading

The Alabama Supreme Court holds that the Alabama statute making a carrier which issues a bill of lading without having received the property described therein liable to an innocent holder of the bill, imposes such liability only when the bill was issued by an agent having authority to issue genuine bills, or by someone under his direction or authority. It does not make the carrier liable for spurious bills of lading issued by an agent, who had only authority to supervise other agents authorized to issue bills of lading, or by unauthorized persons acting under that agent.—National Park Bank v. L. & N. (Ala.), 74 So., 69. Decided February 1, 1917.

##### Inclusion or Exclusion of Branch Lines in Reorganizations

The federal district court for the eastern district of Missouri holds, in a suit to foreclose a mortgage on the Missouri Pacific, that, on reorganization of a railroad system, the advisability of including or excluding a particular subsidiary line, and the terms on which it may be included, depending on its relation and value to the system as a whole and the necessities of the reorganization, present questions which must be left largely to the business judgment of those in charge, unless in an exceptional instance of fraud or grossly inequitable discrimination. Generally the objection to a plan of reorganization should involve a definite principle, and not require a long, complicated investigation of values, properties, etc.—Guaranty Trust Co. v. Missouri Pacific, 238 Fed., 812. Decided November 28, 1916.

##### Owner's Exclusive Right to Terminal Facilities

The New York Public Service Commissions law requires every common carrier to afford all proper and equal facilities for interchange of traffic with every other common carrier, but this section shall not be construed to require a common carrier to permit or allow any other to use its track or terminal facilities, and every common carrier, as such, is required to receive from every other common carrier, at a connecting point, freight cars of proper standard, and haul the same through to destination. The New York Appellate Division holds that the second part of this section does not require interchangeable use of tracks, where the effect of such use would be to permit one carrier to employ the other's terminal facilities for carriage cost alone, so that an order requiring physical connection and interchange of freight is unwarranted. In such section the word "terminals" is applicable, not only to the portion of the main track, sidings and team tracks used in loading and unloading freight, but also to industrial tracks at which freight shipments terminate; a terminal point being a place of consignment. The word "use" in such section, in the provision prohibiting use of terminal facilities of one carrier by another, is not confined to actual presence of locomotives, but the passage of any cars thereover. The provision of such section that it shall not be construed to require a common carrier to permit or allow any other carrier to use its track or terminal facilities is definite and unambiguous. The order of the New York Public Service Commission, Second district, directing that the New York Central and the International Railway at Lockport make such track connections and lay such switches and sidings as to constitute an adequate system for the interchange of freight cars was annulled.—People v. Public Service Commission, 163 N. Y., Supp. 777. Decided March 7, 1917.

## Railway Officers

### Executive, Financial, Legal and Accounting

Whiteford R. Cole has been elected chairman of the board of the Nashville, Chattanooga & St. Louis, succeeding E. C. Lewis, deceased.

E. N. Brown, formerly president of the National Railways of Mexico, has been elected chairman of the board of the Pere Marquette, with headquarters at New York; Frank H. Alfred, formerly general manager for the receivers, has been elected president, with office at Detroit, Mich.; John L. Cramer, formerly controller, is now secretary and treasurer, with office at Detroit; Joline, Larkin & Rathbone, New York, have been appointed chief counsel; Seward L. Merriam, Detroit, has been appointed general counsel; Clarence S. Sikes continues as general auditor at Detroit; E. M. Heberd has been appointed assistant secretary, and W. E. Martin has been appointed assistant treasurer, both with offices at New York.

### Operating

William Scott Campbell, whose appointment as manager and chief engineer of the Kentucky & Indiana Terminal Railroad, with headquarters at Louisville, Ky., has already been announced in these columns, was born on December 19, 1879, near Centralia, Ill., and was educated in the public schools of Patoka, Ill. He began railway work in October, 1897, at Joliet, Ill., with the Elgin, Joliet & Eastern, as a switchman. He later served successively as brakeman and conductor, and from February, 1900, to August, 1914, was, consecutively, general yardmaster, trainmaster and superintendent of terminals on the same road. From July, 1915, to March, 1917, he served in the transportation and operating departments of the Southern Pacific



W. S. Campbell

Company, at San Francisco, Cal., and now becomes manager and chief engineer of the Kentucky & Indiana Terminal Railroad, as above noted.

M. H. Brown has been appointed superintendent of telegraph of the Oregon Short Line and the Western Union Telegraph Company, with headquarters at Salt Lake City, Utah, succeeding E. C. Manson, promoted.

J. E. Turk, assistant to general manager of the Philadelphia & Reading, has been appointed superintendent of the Atlantic City Railroad and the Delaware River Ferry Company, with office at Camden, N. J.

J. S. Douglas has been appointed superintendent of the Savannah & Northwestern, with office at Savannah, Ga., and J. J. Milligan, superintendent at Savannah, has been appointed general agent, with office at the same place.

D. S. Baals, assistant trainmaster and road foreman of engines of the Chesapeake & Ohio, at Cane Fork, W. Va., has been transferred in the same capacity to the Big Sandy division, with headquarters at Paintsville, Ky., vice M. B. Daniels assigned to other duties.

Hanson D. Hilliker has been appointed car service agent of the Union Pacific, with headquarters at Omaha, Neb.; T. S. Kinnersley has been appointed car service agent, with office at Salt Lake City, Utah. All reports heretofore made to the super-

intendent of transportation at Salt Lake City will in the future be made to the car service agent.

L. S. Bourne, superintendent of the Galveston, Harrisburg & San Antonio, at El Paso, Tex., has been appointed general superintendent of the Southern Pacific, Louisiana Lines, at La Fayette, La. He is succeeded as superintendent at El Paso by L. B. McDonald, assistant superintendent and inspector of the Houston terminals. T. C. Worthington, assistant superintendent at San Antonio, Tex., will succeed L. B. McDonald, promoted.

Frank W. Smith, Jr., whose appointment as superintendent of the Cresson division of the Pennsylvania Railroad, with headquarters at Cresson, Pa., has already been announced in these columns, was born on February 20, 1871, at Pittsburgh, Pa. He graduated from Princeton University in 1890, and in February, 1895, entered the service of the Pennsylvania Railroad as a rodman. In May, 1899, he served as a rodman on the Philadelphia division, and the following November was appointed transitman at Altoona, Pa. He was promoted to assistant supervisor of the West Penn division in February, 1900, and subsequently served in that capacity on the Pittsburgh and Middle divisions. On May 1, 1902,



F. W. Smith, Jr.

he was promoted to supervisor of the Philadelphia and Erie division. In January, 1904, he was transferred as supervisor to the Pittsburgh division, and on April 1, 1907, to the Philadelphia Terminal division. He was promoted to division engineer, Conemaugh division, on March 10, 1911, and was transferred to the New York division in a similar capacity on June 16, 1913. On May 1, 1916, he was promoted to assistant superintendent of the New York division, which position he held at the time of his recent appointment as superintendent of the same road, as above noted.

Frederick McQ. Falck, superintendent of the Atlantic City Railroad at Camden, N. J., has been appointed assistant general manager of the Philadelphia & Reading with headquarters at Reading, Pa. He was born on July 5, 1874 at Atlanta, Ga., and graduated from Cornell university in 1894. He began railway work on June 1, 1898, with the Philadelphia & Reading, and the following August was appointed assistant supervisor at Shamokin, Pa. In May, 1900, he was appointed supervisor at the same place and in December, 1901, served as supervisor at Philadelphia, Pa. From May, 1902, to May, of the following year he was supervisor at Trenton Junction, N. J., and then was division engineer of the Shamokin division at Tamaqua, Pa. In June, 1905, he was appointed division engineer of the Reading division at Reading, Pa., remained in that position until March, 1910, and then to the following October he was assistant superintendent of the Wilmington and Columbia division at Reading. From October, 1910, to January, 1913, he was superintendent of the same di-



F. McQ. Falck

vision; in January, 1913, he was appointed superintendent of the Atlantic City Railroad, and now becomes assistant general manager of the Philadelphia & Reading at Reading, Pa., as above noted. Mr. Falck's entire railroad service has been with the Philadelphia & Reading.

R. O. Diehl has been appointed trainmaster of the Handley district of the Chesapeake & Ohio, with headquarters at Handley, W. Va.; vice J. B. Diehl, who has been appointed assistant trainmaster of the New River district, with headquarters at Raleigh, W. Va., vice H. A. Davin. E. G. Foster, assistant trainmaster at Logan, W. Va., has been transferred as assistant trainmaster to the Handley district, with headquarters at Cane Fork, W. Va., vice D. S. Baals transferred, and H. A. Davin, assistant trainmaster at Raleigh, has been appointed assistant trainmaster of the Logan district, with headquarters at Logan, vice Mr. Foster.

Henry J. Roth, who has been appointed division superintendent of the Illinois Central, with office at Mattoon, Ill., was born at Fairfield, Ia., on October 21, 1871. He entered railway service as a telegraph operator with the Union Pacific in November, 1888, and until February, 1912, was consecutively station agent, train despatcher, trainmaster and assistant superintendent. In 1912 he entered the service of the Illinois Central as an inspector of transportation, and later was made trainmaster with headquarters at Carbondale, Ill., where he remained until appointed superintendent, as noted above. He succeeds L. E. McCabe, transferred.

#### Traffic

Edwin L. Lewis, district passenger agent of the Philadelphia & Reading at Philadelphia, Pa., has been appointed assistant general passenger agent, vice W. H. McCormick, assigned to other duties, and George F. Ingram has been appointed district passenger agent, with headquarters at Philadelphia, vice Mr. Lewis.

W. A. Shropshire, general agent of the traffic department of the Western Maryland at Baltimore, Md., has been appointed general eastern agent, with headquarters at New York, succeeding A. D. Phillips, resigned. C. B. Oakley, commercial freight agent at St. Louis, Mo., succeeds Mr. Shropshire, and T. T. Adams, traveling freight agent at Baltimore, succeeds Mr. Oakley.

Ellis Farnsworth, general agent of the passenger department of the Missouri Pacific-St. Louis, Iron Mountain & Southern at Chicago, Ill., has been appointed assistant general passenger agent at Kansas City, Mo., succeeding R. T. G. Matthews, assigned to other duties. W. H. Donny, city passenger agent at Chicago, will succeed Mr. Farnsworth as general agent, passenger department, with same headquarters.

M. W. Dancy, division passenger agent of the Chicago & Alton at Springfield, Ill., has been appointed general agent, passenger department, with headquarters at St. Louis, Mo., succeeding H. A. Crow, resigned to enter other business. E. H. Yarke, district passenger agent at Peoria, Ill., has been appointed division passenger agent at Springfield, succeeding M. W. Dancy. Edward E. Olson, city passenger agent at Chicago, Ill., has been appointed district passenger agent at Peoria, succeeding Mr. Yarke.

#### Engineering and Rolling Stock

E. F. Thomson, chief clerk to the president of the Chicago, Indianapolis & Louisville at Chicago, Ill., has been appointed assistant to the superintendent of motive power at Lafayette, Ind.

G. P. Trachta, road foreman of engines of the Chicago, Burlington & Quincy at McCook, Neb., has been appointed master mechanic at Casper, Wyo., succeeding J. O. McArthur, transferred.

W. H. Vance, chief engineer of the Louisiana & Arkansas, with office at Stamps, Ark., has been appointed engineer maintenance of way of the St. Louis Southwestern, with office at Tyler, Tex.

C. L. Sharp, general foreman of locomotives, Chicago, Rock Island & Pacific, at Shawnee, Okla., has been appointed master mechanic of the Louisiana division at El Dorado, Ark., succeeding W. P. Eddy, promoted.

J. E. Johnson, division engineer of the Pere Marquette at Saginaw, Mich., has been appointed division engineer of the Michigan Central, at St. Thomas, Ont., succeeding S. D. Williams, Jr., assigned to special work at Detroit, Mich.

Walter Alexander, chairman of the Railroad Commission of Wisconsin, has been appointed superintendent of motive power of the Chicago, Milwaukee & St. Paul, with office at Milwaukee, Wis., succeeding A. E. Manchester, promoted to general superintendent. A photograph of Mr. Alexander and a sketch of his career were published in the *Railway Age Gazette* of August 25, 1916, page 344.

Walt Dennis, assistant engineer of the Chicago, Rock Island & Pacific, with office at Chicago, Ill., has been appointed principal assistant engineer of the Wabash, with headquarters at St. Louis, Mo. He was born at Alliance, Ohio, in 1879

and graduated from the Kansas State University in 1900. He entered railway service with the Kansas City Southern as an axeman and rodman in the maintenance of way department in 1900. During 1902 he was in the employ of Waddell & Hedrick, Kansas City, Mo., as a bridge draftsman and in 1903 went with the Kansas City, Mexico & Orient on location and construction work. In 1904 he was appointed chief delineator on double track and new construction work on the

Union Pacific and in 1906 became associated with Horace G. Burt, consulting engineer, on special reports in connection with grade reduction and economics. In 1907 he returned to the Kansas City Southern in the capacity of office engineer. In 1912 he joined the engineering department of the Chicago, Rock Island & Pacific and was successively up to the time of his present appointment location engineer, construction engineer, special engineer and assistant engineer on special investigation on the system.

#### Special

C. T. Winkless has been appointed superintendent of fuel of the Chicago, Rock Island & Pacific, with headquarters at Chicago, Ill. He will have charge of fuel purchase, distribution and handling. W. J. Eddy, master mechanic at El Dorado, Ark., has been appointed superintendent of fuel economy. The engineer of fuel economy and the supervisor of stationary plants will report to the superintendent of fuel economy.

#### OBITUARY

Captain Willard Thomson, vice-president and general manager of the Baltimore, Chesapeake & Atlantic, and also of the Maryland, Delaware & Virginia, both subsidiaries of the Pennsylvania Railroad, died at his home in Wilmington, Del., on April 17, at the age of 80. Mr. Thomson was born in Bath, Me., and in his earlier years followed the sea. Both of the railroads named have water lines, and Captain Thomson had had charge of steamboat interests for the Pennsylvania Railroad for about 50 years.

James Burke, superintendent of the Chicago Terminal division of the Erie, at Chicago, died at his home in that city of pneumonia on April 17. Mr. Burke was born at Oswego, N. Y., in 1856. He entered railway service with the Chicago, Milwaukee & St. Paul in 1873, was in the engineering corps of the Chicago & North Western between 1878 and 1879, was work train conductor and assistant roadmaster on the Atchison, Topeka & Santa Fe between 1880 and 1882 and division roadmaster on the Minneapolis & St. Louis between 1883 and 1886. The following three years he was division roadmaster of the Minneapolis, St. Paul & Sault Ste. Marie and between 1889 and 1893 was superin-



W. Dennis

tendent of construction for the same company. During the following five years he was general roadmaster of the Soo lines and in 1899 was appointed division engineer of the Baltimore & Ohio. He became connected with the Erie in 1902 as engineer maintenance of way at Cleveland, O. He was later appointed superintendent of roadway, bridges and buildings with headquarters at the same city, and in January, 1914, was appointed to the position he held at his death.

Chester Mitchell Dawes, general counsel of the Chicago, Burlington & Quincy, with office at Chicago, Ill., died at his home in that city April 12, of angina pectoris, age 62 years. He



C. M. Dawes

was born at North Adams, Mass., July 14, 1855, and graduated from Yale University in 1876. In 1878 he was admitted to the Bar of Illinois and, after a few years of private practice, entered the legal department of the Chicago, Burlington & Quincy in 1886, since which time up to 1907 he had been consecutively solicitor, assistant general solicitor and general solicitor for this same company. In April, 1907, he was appointed general counsel, with headquarters at Chicago, Ill., which latter position he continued to hold up to the time of his death as noted above. Mr. Dawes had assumed a leading part in many of the rate cases and important suits of the western roads in recent years. In the Missouri River rate case, in the 1910 rate advance case and again in the Western rate advance case in 1915 he was prominently identified with the presentation of the railway arguments. For a number of years he has also been chairman of the organization of railway general counsel in Chicago.

Fayette R. Rockwell, assistant general manager of the Denver & Rio Grande, Utah lines, at Salt Lake City, Utah, died at his home in that city on April 12, from an attack of acute indigestion. He was born at Hornellsville, N. Y., on May 2, 1864. He entered railway service in 1875 as a messenger on the Erie; from 1876 to 1879 he was telegraph operator for the same road, and from 1879 to 1883 train despatcher. In the latter year he entered the employ of the Denver & Rio Grande as train despatcher, and in 1887 was promoted to chief train despatcher, and later to trainmaster. He was made superintendent of the Florence & Cripple Creek in October, 1899; in May, 1901, he became a division superintendent of the Denver & Rio Grande, leaving the service in November, 1902, to engage in mercantile business. He returned to the Denver & Rio Grande in November, 1904, as division superintendent at Pueblo, Colo. From June, 1909, to October, 1910, he was out of railway service, but returned in 1910 as general superintendent of the Colorado lines of the Denver & Rio Grande, with office at Denver, Colo. In January, 1916, he was appointed assistant general manager of the Utah lines of this company, with headquarters at Salt Lake City, Utah, which position he continued to fill up to the time of his death, as noted above.



F. R. Rockwell

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## Equipment and Supplies

### LOCOMOTIVES

THE RED RIVER & GULF will come into the market for one or two locomotives and some freight cars in the near future.

THE UTAH-IDAHO SUGAR COMPANY, Salt Lake City, Utah, will probably come into the market in the near future for locomotives and freight equipment in connection with its sugar business.

THE PRINEVILLE CITY, a new steam line now being built near Prineville, Ore., will purchase some miscellaneous equipment, including several locomotives and a number of freight cars, about September 1, 1917.

THE CHICAGO & ILLINOIS MIDLAND has ordered 2 Mikado locomotives from the American Locomotive Company. These locomotives will have 22 by 28-in. cylinders, and a total weight in working order of 225,000 lb.

RUSSIAN GOVERNMENT.—A press despatch from Petrograd dated April 13 says: "The Russian Provisional Government has decided to place a contract in the United States for 40,000 railway cars and 2,000 locomotives. Delivery is specified for July, 1918."

THE SOUTH AFRICAN GOVERNMENT RAILWAYS have ordered 10 Mountain type locomotives from the American Locomotive Company. These locomotives will have 22 by 28-in. cylinders and a total weight in working order of 200,000 lb. This order is in addition to one for 8 Mallet type locomotives given to the American Locomotive Company, and reported in the *Railway Age Gazette* of April 6.

THE PERE MARQUETTE, reported in the *Railway Age Gazette* of March 16 as having issued inquiries for 6 Santa Fe type locomotives, has ordered 15 Santa Fe and 10 eight-wheel switching locomotives from the American Locomotive Company. The Santa Fe type locomotives will have 26 by 32-in. cylinders, and a total weight in working order of 320,000 lb. The eight-wheel switching locomotives will have 22 by 28-in. cylinders, and will weigh 204,000 lb.

### FREIGHT CARS

RUSSIAN GOVERNMENT.—See item under Locomotives.

THE RED RIVER & GULF.—See item under locomotives.

THE UTAH-IDAHO SUGAR COMPANY.—See item under Locomotives.

THE UNION RAILROAD has ordered 250 gondola cars from the Standard Steel Car Company and 250 from the Pressed Steel Car Company.

THE MARSH REFRIGERATOR SERVICE COMPANY of Milwaukee, Wis., formerly the Milwaukee Refrigerator Transit and Car Company, will soon come into the market for steel underframes.

### PASSENGER CARS

THE GREAT NORTHERN, reported in the *Railway Age Gazette* of March 2 as having issued inquiries for 20 postal cars, has ordered 20 combination baggage and mail cars from the American Car & Foundry Company.

### IRON AND STEEL

THE NORFOLK & WESTERN has ordered 200 tons of bridge steel.

### MISCELLANEOUS

THE TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS has awarded a contract to the Roberts & Schaefer Company, Chicago, for the designing and building of a large reinforced concrete, automatic electric locomotive coaling plant, for coaling on two tracks, which will be built immediately at East St. Louis, Ill.

## Supply Trade News

A. C. Loudon is now on the staff of the Locomotive Superheater Company, 30 Church street, New York.

Thomas Dunbar has been elected president of the Acme Supply Company of Chicago, succeeding H. H. Schroyer, retired.

George H. Sargent, president of Sargent & Co., New Haven, Conn., died at his home in New York, April 14, at the age of 89 years.

Henry B. Oatley, chief engineer of the Locomotive Superheater Company, has been called to active duty as a lieutenant in the New York naval reserves.

The Pyle-National Company, Chicago, announces that after April 8, 1917, its general offices will be located at 1334 North Kostner avenue, Chicago, instead of 900 South Michigan avenue, as heretofore.

Leon P. Alford, editor of the American Machinist for the past 10 years, has recently become associated with Industrial Management, formerly Engineering Magazine, as editor-in-chief. He has been succeeded as editor of the American Machinist by John H. Van Deventer.

Frederick C. Blanchard, who was recently elected vice-president in charge of manufacturing for the Detroit Lubricator Company, with headquarters at Detroit, Mich., was born in Boston, Mass., October 19, 1869.

He graduated from the Massachusetts Institute of Technology with a degree in mechanical engineering in 1891. Prior to being elected to the above position he was for four years production manager for the Fort Wayne Electric Works, Fort Wayne, Ind., leaving this concern to become works manager of the Ashcroft Manufacturing Company and the Consolidated Safety Valve Company owned by Manning, Maxwell & Moore, New York City. Later he was made chairman of the manufacturing committee of the latter corporation, then being elected a member of the board of directors. He has now resigned these several connections to become vice-president in charge of manufacturing of the Detroit Lubricator Company.

The Automatic Railway Crossing Guard Company, Broken Arrow, Okla., has been incorporated with an authorized capitalization of \$200,000 for the manufacture of automatic cattle guards. R. W. Mitchell, of Broken Arrow, and J. R. Burress, of Dallas, Tex., are among the incorporators.

In response to the appeal made on March 10 to the members of the engineering profession in the United States, 1,072 contributions, amounting to \$10,711.75, have been received for the fund being raised in America by a committee of leading engineers for the Professional Classes War Relief Council, Inc., which was organized in Great Britain shortly after the outbreak of the war.

The Louis L. Brown Company, Inc., has been formed by Louis L. Brown, formerly vice-president of the Foundation Company, and James H. Small, Jr., formerly chief engineer of the Patrick Ryan Construction Corporation, to handle the construction of foundations by open and pneumatic methods, shoring and under-pinning, concrete masonry and timber construc-

tion, earth and rock excavation and dock, bridge, and tunnel work. This company has offices at 30 Church street, New York.

W. J. Kelleher, purchasing agent of the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific, with headquarters at New Orleans, La., has resigned, effective May 1, to assume a position as general manager with the Southern Creosoting Company at Slidell, La. He was born at Cincinnati, Ohio, October 2, 1871, and entered railway service June 20, 1884, as office boy to the superintendent of bridges and buildings of the St. Louis, Iron Mountain & Southern at Little Rock, Ark. From 1887 to 1890 he was first a messenger and then stenographer to the superintendent of bridges and buildings of the Wabash at Springfield, Ill. From March, 1890, and up to January, 1896, he was a stenographer to the superintendent of the New Orleans & Northeastern at New Orleans and from January, 1896, to November, 1905, he was chief clerk in the office of the president and general manager of this same road, and also of the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific. On November 1, 1905, he was appointed purchasing agent of these three roads, which position he will continue to fill up to the time his resignation becomes effective.

The United States Circuit Court of Appeals for the Seventh Circuit handed down a decision at Chicago, on April 10, on an appeal of the Track Specialties Company from a decision of the District Court for the Northern District of Illinois, Eastern Division, enjoining the manufacture, sale and use of the Superior rail anchor, affirming the decision of the lower court. The suit was brought by Otto R. Barnett against the Track Specialties Company and involved the infringement of certain claims in the patent for rail anchors issued to John L. Pope on August 21, 1900, to Edward Lass and Hiram H. Sponenburg, on February 10, 1903, and to David F. and David L. Vaughan on March 26, 1912, by the anchor shown in a patent issued to John A. Bodkin on January 16, 1912. The District Court held that the Bodkin patent infringed the claims of the three other patents and the Circuit Court affirmed this decision.

At a special stockholders meeting of the Milwaukee Refrigerator Transit & Car Company, held Saturday, April 7, a sale of the entire business of this company to the Marsh Refrigerator Service Company was authorized effective, May 1. The latter company was recently incorporated with a capitalization of \$800,000 for the purpose of taking over the business formerly conducted by the Milwaukee Refrigerator Transit & Car Company. The business will in future be under the active management of H. W. Marsh, who has been identified with the old company for seven years as its vice-president and general manager. The officers of the new company are H. W. Marsh, president, Oliver C. Fuller, vice-president, and J. J. O'Connor, secretary. The new company will continue to operate the refrigerator car lines and will manufacture, sell, repair and lease refrigerator cars as well as rebuild and repair all classes of railroad freight cars at its Milwaukee car shops. Owing to the increasing demand for refrigerator cars equipped with steel underframes the new company proposes to invest a considerable sum of money in steel underframes, standardizing and modernizing its entire equipment. The general policy and conduct of the business will remain unchanged.

### Electric Drive for Battleships Colorado and Washington

Contracts totaling approximately \$2,000,000 have been placed recently with the Westinghouse Electric & Manufacturing Company by the New York Shipbuilding Company for furnishing the necessary electrical equipments for the propulsion of the new super-dreadnaughts Colorado and Washington.

The equipments to be furnished are practically of the same design as that contracted for by the Navy Department for the U. S. S. Tennessee now building at the New York navy yard. The four propellers, as in the case of the Tennessee, instead of being mechanically connected to driving engines or turbines, are to be driven by individual motors. The current for the motors will be furnished by two turbine generators.

In addition to the main generating equipments and propelling motors, the contracts include auxiliaries for the main turbine generators and smaller auxiliary turbine generators for supplying light and power throughout the ships. Westinghouse electric motors will also be utilized for doing nearly all the work on board from raising the anchor to steering.



F. C. Blanchard

**James Buchanan Brady**

James Buchanan Brady, vice-president of the Standard Steel Car Company and one of the railway supply field's great salesmen, died at Atlantic City, April 13. Mr. Brady was born in New York City, August 12, 1855, and was a life-long resident of that city. He was educated in its public schools and began his business life as a messenger boy in the offices of the New York Central Railroad. He soon afterward found employment with the firm of Manning, Maxwell & Moore, and very soon showed a decided salesmanship ability, and it was through that channel that he grew into national prominence. After he was with Manning, Maxwell & Moore a number of years he became identified with the Fox-Pressed Steel Company, subsequently the Pressed Steel Car Company. He became associated with the Standard Steel Car Company upon its organization 15 years ago and was its vice-president from its organization up to the time of his death. Mr. Brady was also president and director of the Independent Pneumatic Tool Company, vice-president and director of Manning, Maxwell & Moore, Inc.; president and director of the Thermotom Company, director of the United Injector Company, vice-president of the Keith Car and Manufacturing Company and of the Osgood Bradley Car Company, director of the Consolidated Safety Valve Company, and he was interested in several other enterprises connected with railroad products.

James Buchanan Brady was familiarly known to Broadway as "Diamond Jim," but he was known in the railway field as an exceedingly keen business man. He had an extremely wide acquaintance among the higher railway officers and was recognized as an extremely successful salesman of railway cars and other railway supplies. Said one of his business associates: "His charitable traits and activities are well known, except as to their extent, which covered a wide latitude. He would go the limit for a friend and could not refuse one a favor."

**J. B. Brady**

**STEEL PLATFORMS FOR ELEVATING TRUCKS.**—Bulletin No. 37, recently issued by the McMyler-Interstate Company, Bedford, Ohio, illustrates that company's steel platforms for use with hand operated elevating trucks. These steel platforms have the advantage over wooden platforms of strength, compactness, suitability for stacking, and of course they are less liable to damage by fire than wooden platforms.

**OVERHEAD HAND-TRAVELING CRANES.**—Catalogue P, recently issued by the Brown Hoisting Machinery Company, Cleveland, Ohio, describes that company's line of Brownhoist overhead hand-traveling cranes. The booklet in its 36 pages shows the construction of the cranes and trolleys, and contains a large number of illustrations of the cranes, of their essential parts, also of some of the shops in which this equipment has been installed.

**WOOD BLOCK FLOORS.**—The Ayer & Lord Tie Company, Chicago, has issued a 24 page booklet illustrating and describing its interior wood block floors. This book describes the history of wood blocks for floors and pavements; their advantages for interior use from the standpoint of sanitation, comfort, cleanliness and general efficiency; and contains an exposition of the material and workmanship necessary for good results and a list of industrial and commercial structures for which these floors are applicable. The booklet is well illustrated by photographs showing numerous installations of these floors.

**Railway Construction**

**ASHLAND-GREENUP RAILWAY (ELECTRIC).**—This company has given a contract to the Vaughan Construction Company, Shaws-ville, Va., to build a line from Ashland, Ky., to Russell, five miles. The line is to be extended later to Greenup, about 10 miles; additional construction work is expected to begin in the near future. The surveys have not yet been completed. J. L. Vaughan will probably be president of the company; Powell & Clarke, Ashland, Ky., are the engineers.

**CITY OF PRINEVILLE.**—This is the name of a new steam road now being constructed from Prineville, Ore., to a junction with the Oregon Trunk at a point half way between Redmond and Perrabonne, a distance of about 18½ miles. Contracts for the grading of this line have been awarded to E. T. Johnson & Son, Portland, Ore. A number of small bridges and the track laying will be done by company forces. The grading will average 8,000 cu. yd. per mile; the maximum grade will be 2½ per cent, and the maximum curve 10 deg. It is expected that this road will be in operation by September 1, 1917.

**ESSEX TERMINAL RAILWAY.**—This company will make surveys, it is said, for an electric line to be built from Ojibway, Ont., south to Amherstburg, about 12 miles. Owen McKay is the engineer.

**MISSISSIPPI & WESTERN.**—This company is building a line from Stevens, Miss., on the Gulf, Mobile & Northern, via Seven Springs, to Fouke, 12 miles; track has been laid on about 7 miles, and it is expected that the line will be completed and in operation by May. An extension is projected from Fouke east to Paulding, thence southeast to Vossburg, about 18 miles, where connection is to be made with the New Orleans & Northeastern. The line is being built to carry lumber and merchandise. C. W. Fouke, president; W. G. Little, general manager, Texarkana, Ark. (February 23, 1917, p. 338.)

**NORTH CAROLINA ROADS.**—Plans are now under consideration for the construction of a 12-mile line, it is said, from Bridgewater, N. C., southeast to timberlands in Rutherford and Cleveland counties. W. M. Wright, Memphis, Tenn., and F. M. Bachman, Indianapolis, Ind., are interested.

**NORTH GEORGIA MINERAL.**—This company has been chartered in Georgia with authorized capital of \$1,250,000. The corporation is regarded as a subsidiary of the Louisville & Nashville. It contemplates building a line 50 miles long from Atlanta northwest to a point near Cartersville, running through Fulton, Cobb, Cherokee and Bartow counties. The line is parallel to the Western & Atlantic, owned by the state of Georgia and leased to the Nashville, Chattanooga & St. Louis, which is controlled by the L. & N. The names of William G. Morrison, A. C. King, H. S. Collingsworth, Hughes Spalding, John Morris, A. E. Thornton, George S. Lowndes, Daniel McDougald and James S. Floyd, all of Atlanta, are given as incorporators. The charter was applied for in October, 1914, but, at the instance of Governor Slaton, the application was delayed so that the legislature might pass a law prohibiting the secretary of state from issuing a charter whereby any railroad might parallel the Western & Atlantic. The law was passed, but the Supreme Court declared it unconstitutional.

**SOUTHERN RAILWAY.**—The contracts for grading on double track work between Charlotte, N. C., and Mt. Zion, S. C., let recently by the Southern Railway System, were awarded as follows: To Robert Russell, Charlotte, for the section from Charlotte to Belmont, 10.9 miles; to Crawford-Morrow Company, Atlanta, from Belmont to Bessemer City, 16.8 miles; to C. W. Lane & Co., Atlanta, from Bessemer City to Blacksburg, 18 miles; to Brooks-Callaway Company, Atlanta, from Blacksburg to Gaffney, 9.6 miles, and from Cowpens to Mt. Zion, 5.8 miles; to Dunnavant & Gunter Company, Knoxville, Tenn., from Gaffney to Cowpens, 10.4 miles. On the Charlotte-Belmont section grading for double track has been completed on 1.9 miles north of Belmont; this includes the approaches to the new bridge over

the Catawba river; only single track has been placed on the bridge, and this is now in service, although the masonry was constructed for double track. (April 13, p. 808.)

### RAILWAY STRUCTURES

BALTIMORE, Md.—W. W. Atterbury, vice-president of the Pennsylvania Railroad, announces that \$3,500,000 is to be spent in the construction of a new grain elevator at Canton (Baltimore). The company also has plans prepared, which, however, are subject to delay until the city of Baltimore passes the necessary ordinances, for the expenditure of \$14,000,000 on other improvements in that city, including duplicates of the two tunnels of the Philadelphia, Baltimore & Washington, one east of the Union station and one west thereof. With the additional tunnels the company will have a four-track line through the city.

BEAUMONT, Tex.—The Gulf Coast Lines are making plans to build a freight and passenger terminal at this point. For this purpose property to the value of \$75,000 has been purchased within the past few weeks. It is expected that work will begin as soon as the plans now being drawn up are passed upon.

COUNCIL BLUFFS, Ia.—The Chicago & North Western will build a large grain elevator at this point. The structure will be of reinforced concrete and equipped with all modern conveniences for cleaning, drying and treating grain. The capacity of this elevator will be 1,275,000 bushels, of which 975,000 will be contained in the bins, and the balance in the work house. Several small buildings, including office, transformer house, shop, boiler house and dust house, will also be erected. About 6½ miles of new track will be laid in the yards. The cost is estimated at \$1,250,000.

KINGSTON, N. Y.—Plans are being made by the New York Central for the elimination of grade crossings at Broadway in Kingston.

MOUNT VERNON, N. Y.—The contract for the construction of the viaduct across the Harlem division of the New York Central and the valley of the Bronx river has been let to the Crown Bar Construction Company. The price is said to be \$90,000. This viaduct crosses the New York Central at Broad street, and the company is to build a passenger station there. This is about one mile north of the principal station in Mount Vernon.

PITTSBURGH, Pa.—The bridge of the Pennsylvania Lines West over the Allegheny river at Pittsburgh is to be raised, to comply with an order of the War Department.

WATERTOWN, N. Y.—An order is expected to be issued in the near future by the New York Public Service Commission, Second district, for the elimination of the grade crossing at Court street, Watertown, on the Watertown branch of the New York Central. This is to be accomplished by carrying the street over the tracks and the Black river, which parallels the tracks, on a concrete-steel viaduct with earth approaches. There will be a four-span bridge, to have a total length of 500 ft., requiring about 220 tons of steel and the construction of 23,000 cu. yd. of reinforced concrete.

WESLEYVILLE, Pa.—A subway is to be built for the joint use of the New York Central, the New York, Chicago & St. Louis, and the East Erie Commercial Railroad, at Water street, Wesleyville, at a cost of about \$300,000. It will have a headroom of from 14 ft. to 16 ft., and will be 90 ft. long.

FRENCH AND AMERICAN CAR SPECIFICATIONS.—We read in an American contemporary that the leading railway car works in the United States are trying to induce the French government to accept American instead of French specifications for 20,000 to 40,000 freight cars now in the market for the state railways of that country. The French specifications provide for so fine and elaborate a finish that the prices which the American builders must quote are very high, and the buyers are reluctant to close. This remark of our American contemporary will cause no surprise to those who have been able to compare side by side a French and an American freight car. Such an opportunity occurred at the Paris Exhibition of 1900, where American, all-steel, high-capacity cars met with a large amount of criticism in regard to finish on the part of French users of rolling stock.—*Engineering, London.*

### Railway Financial News

BOSTON & MAINE.—Stockholders of the Manchester & Lawrence, one of the Boston & Maine leased lines, have voted almost unanimously to approve of the reorganization plan which the majority stockholders of the Boston & Maine have formulated.

CANADIAN PACIFIC.—Senator Frederick L. Boique has been elected a director of the Canadian Pacific, succeeding Robert Mackay, deceased.

See editorial comments on the annual report of the Canadian Pacific elsewhere in this issue.

CHICAGO, MILWAUKEE & ST. PAUL.—The National City Company, New York, is offering Chicago, Milwaukee & St. Paul general and refunding 4½ per cent bonds of 1914-2014 at 94½, yielding 4¾ interest on the investment.

CHICAGO, ROCK ISLAND & PACIFIC.—After a directors' meeting held on April 12 it was announced that a special stockholders' meeting would be called for some time in June, at which meeting authorization will be asked for the increase in authorized stock called for under the reorganization plan. It is believed that nearly \$1,000,000 in money, representing legal expenses, etc., and a very considerable amount of time can be saved if reorganization takes place without foreclosure. The reorganization plan which various interests and protective committees have agreed to leaves the question of whether or not foreclosure and formation of a new company will take place in carrying out the plan optional.

COLORADO MIDLAND.—The protective committee representing the 4 per cent bonds of the Colorado Midland, James N. Wallace, chairman, has announced the abandonment of the plan of reorganization in view of the refusal by the courts to postpone the foreclosure sale of the property scheduled for April 21. Back of the committee's determination to abandon the reorganization plan is the fact that only about 60 per cent of the bonds have been deposited with the committee. Another element in the situation which has delayed readjustment proceedings is that about \$1,500,000 are held in London, and the British treasury has refused to allow English holders to pay the \$200 per bond assessment. The total amount of the bonds outstanding is \$9,532,000.

The amount of money which would have been raised had the plan been declared effective would have been \$1,906,400. In return for the assessment bondholders would have received 20 per cent of their holdings in new preferred stock, 90 per cent in new common, and in addition a common stock bonus of 10 per cent.

DELAWARE & HUDSON.—See editorial comments on the annual report elsewhere in this issue.

ERIE.—The Cleveland & Mahoning Valley, which is the leased line of the Erie from the Ohio-Pennsylvania state line to Cleveland, has obtained authorization from the stockholders for an increase of \$3,000,000 in the preferred stock. This stock is paying 4½ per cent, and the proceeds of the issue, if sold, would be available for grade elimination in Cleveland.

KANSAS CITY, MEXICO & ORIENT.—This road has been placed in the hands of W. T. Kemper as receiver.

U. S. RAILWAY IN CHINA BRINGS FRENCH PROTEST.—Press despatches say that the French minister at Peking has protested to the foreign office against the building of an American railway through the province of Kwangsi. The minister produced a hitherto unpublished note from former Foreign Minister Sun Pao-Chi, written in September, 1914, pledging China to give the French preference in the financing of railways and mines in Kwangsi. The keeping of this agreement secret is regarded as a violation of the open door. Dr. Paul Reinsch, the American minister, has referred the protest to the State Department at Washington.

[ADVERTISEMENT.]

## ANNUAL REPORTS

### THE DELAWARE AND HUDSON COMPANY—EIGHTY-SEVENTH ANNUAL REPORT

NEW YORK, N. Y., March 27, 1917.

To the Stockholders of

The Delaware and Hudson Company:

The President and the Board of Managers submit the following statements of the affairs of your company for the year which ended with December 31, 1916:

The results from operation of the Coal Mining department were:

Year.	Coal mined.	Revenues.	† Expenses.	Net revenues.
1916.....	7,186,380 tons.	\$15,758,765.02	\$15,020,371.89	\$738,393.13
1915.....	8,100,767 tons.	15,860,676.65	14,616,705.70	1,243,970.95
Increase....	* 914,387 tons.	* \$101,911.63	\$403,666.19	* \$505,577.82

\* Decrease.

† Excluding taxes.

The results from operation of the Railroad department were:

Year.	Miles operated.	Operating revenues.	† Operating expenses.	Net operating revenues.	Percentage of expenses to revenues.
1916.....	909.38	\$26,634,426.00	\$18,111,094.72	\$8,523,331.28	68.00
1915.....	909.07	23,787,519.00	14,823,625.67	8,963,893.33	62.32
Increase....	.31	\$2,846,907.00	\$3,287,469.05	* \$440,562.05	5.68

\* Decrease.

† Excluding taxes.

#### RAILROAD DEPARTMENT.

##### REVENUES AND EXPENSES.

The general distribution of the operating revenues and of the operating expenses of the Railroad department was as follows:

	1916.	1915.	INCREASE OR DECREASE.
<b>REVENUES:</b>			
From Coal freight traffic...	\$11,769,005.00	\$11,311,690.00	\$457,315.00
" Merchandise freight traffic (including switching).....	10,748,020.04	8,788,365.15	1,959,654.89
" Passenger traffic.....	3,124,316.96	2,774,595.02	349,721.94
" Express traffic.....	379,353.00	338,464.42	40,888.58
" Transportation of mails	125,382.00	129,618.41	-4,236.41
" Miscellaneous sources.....	488,349.00	444,786.00	43,563.00
Total operating revenues .....	\$26,634,426.00	\$23,787,519.00	\$2,846,907.00

	1916.	1915.	INCREASE OR DECREASE.
<b>EXPENSES:</b>			
For Maintenance of way and structures.....	\$2,127,853.31	\$1,852,166.23	\$275,687.08
" Maintenance of equipment.....	4,970,920.00	3,703,382.44	1,267,537.56
" Traffic expenses.....	341,579.84	315,991.63	25,588.21
" Transportation expenses.....	9,513,924.59	8,007,980.07	1,505,944.52
" Miscellaneous operations.....	223,457.32	190,758.14	32,699.18
" General expenses.....	957,517.60	775,645.74	181,871.86
Less Transportation for investment, Cr.....	Cr. 24,157.94	Cr. 22,298.58	Cr. 1,859.36
Total operating expenses .....	\$18,111,094.72	\$14,823,625.67	\$3,287,469.05
Net revenues from operation..	\$8,523,331.28	\$8,963,893.33	-\$440,562.05
Percentage of expenses to revenues.	68.00	62.32	5.68

#### GENERAL INCOME ACCOUNT OF THE DELAWARE AND HUDSON COMPANY, YEAR ENDED DECEMBER 31, 1916, IN COMPARISON WITH YEAR ENDED DECEMBER 31, 1915.

	1916.	1915.	INCREASE OR DECREASE.
<b>COAL MINING DEPARTMENT:</b>			
Gross revenues .....	\$15,758,765.02	\$15,860,676.65	-\$101,911.63
Gross expenses .....	15,020,371.89	14,616,705.70	403,666.19
Net revenues .....	\$738,393.13	\$1,243,970.95	-\$505,577.82
Taxes accrued .....	615,090.42	467,932.98	147,157.44
Operating income .....	\$123,302.71	\$776,037.97	-\$652,735.26
OTHER INCOME:			
Dividends and interest.....	704,249.52	704,762.42	-512.90
Gross income, Coal department.....	\$827,552.23	\$1,480,800.39	-\$653,248.16
<b>RAILROAD DEPARTMENT:</b>			
Gross operating revenues...\$26,634,426.00	\$23,787,519.00	\$2,846,907.00	
Gross operating expenses... 18,111,094.72	14,823,625.67	\$3,287,469.05	
Net operating revenues....	\$8,523,331.28	\$8,963,893.33	-\$440,562.05
Taxes accrued .....	756,454.75	680,119.39	76,335.36
Operating income .....	\$7,766,876.53	\$8,283,773.94	-\$516,897.41
OTHER INCOME:			
Hire of equipment.....	Dr. 454,052.71	142,489.15	596,541.86
Dividends and interest.....	763,593.72	879,983.60	-116,389.88
Miscellaneous items.....	94,573.35	50,591.52	43,981.83
Total other income....	\$404,114.36	\$1,073,064.27	-\$668,949.91
Gross income, Railroad department.....	\$8,170,990.89	\$9,356,838.21	-\$1,185,847.32
DEDUCTIONS FROM INCOME:			
Rentals .....	1,928,475.28	1,999,352.44	-70,877.16
Interest on First and Refunding Mortgage bonds (1943) .....	1,288,160.00	1,288,160.00	.....
Interest on First Mortgage bonds (1917) .....	350,000.00	350,000.00	.....

	1916.	1915.	INCREASE OR DECREASE.
Interest on Debenture Bonds (1916) .....	256,171.67	558,920.00	-\$302,748.33
Interest on First Lien Equipment bonds (1922) .....	430,953.00	433,935.00	-2,982.00
Interest on Five Per Cent 20-Year Gold bonds (1935) .....	391,381.25	.....	391,381.25
Interest on Divisional bonds .....	75,000.00	75,000.00	.....
General interest and discount .....	112,204.70	135,585.80	-\$23,381.10
Total deductions .....	\$4,832,345.90	\$4,840,953.24	-\$8,607.34

	1916.	1915.	INCREASE OR DECREASE.
Net income, Railroad department .....	\$3,338,644.99	\$4,515,884.97	-\$1,177,239.98

	GENERAL:	MISCELLANEOUS INCOME:	
Dividends and interest on securities owned .....	\$13,516.00	\$25,432.61	-\$11,916.61
Rentals, real estate .....	14,015.07	25,717.05	-\$11,701.98
General interest and discount .....	117,332.28	98,154.29	19,177.99
Total income .....	\$144,863.35	\$149,303.95	-\$4,440.60
Taxes accrued .....	10,074.58	9,501.89	572.69
Interest on Five Per Cent 20-Year Gold bonds.....	332,893.02		
Less interest on proceeds .....	190,279.21		
	Dr. 142,613.81	Dr. 65,046.78	Dr. 77,567.03
Total deductions .....	\$152,688.39	\$74,548.67	\$78,139.72
Net income, general.....	Loss 7,825.04	74,755.28	-\$82,580.32
Net income carried to General Profit and Loss.....	\$4,158,372.18	\$6,071,440.64	-\$1,913,068.46
Percentage to capital stock.....	\$42,503,000.00		

#### FINANCIAL.

##### CAPITAL STOCK AND FUNDED DEBT.

The capital stock of the Delaware and Hudson Company on December 31, 1916, was \$42,503,000, there having been no change during the year.

The total funded debt on December 31, 1916, was \$62,462,000. The Convertible Four Per Cent Debentures of 1906, aggregating \$13,973,000, matured on June 15, 1916, and were paid.

#### SINKING FUNDS.

During the year there was paid to the Trustee under the First and Refunding Mortgage the sum of \$322,040, being one per cent of the par value of the First and Refunding Mortgage Gold Bonds outstanding on June 1, 1916, making the total paid to December 31, 1916, \$2,129,070. This sum has been expended in additions and betterments to the mortgaged property in accordance with the trust agreement.

The amount paid to the Trustee under the First Lien Equipment Trust indenture during the year was \$650,000. The total paid to date is \$5,850,000, which has been increased by accumulations of interest on balances and investments. Complying with the agreement, bonds issued thereunder having a value of \$693,000 have been purchased at a cost, including accrued interest, of \$708,514.77 and retired; \$2,943,582.90 has been expended for equipment which has been made subject to the indenture, and securities and cash to the amount of \$2,678,585.43 are now held by the Trustee.

There was accumulated in the Coal department sinking fund during the year, in accordance with the ordinance passed on May 9, 1899, and amended on May 10, 1910, \$311,003.92, which has been applied to reimburse the treasury for expenditures for coal lands and for unmined coal in Pennsylvania.

#### DIVIDENDS.

A dividend was declared on December 27, 1916, to be paid out of the accumulated surplus, upon the outstanding \$42,503,000 of capital stock, at the rate of nine per cent, amounting in the aggregate to \$3,825,270, payable during 1917, as follows:

- Two and one-quarter per cent to stockholders of record on February 26, 1917, payable on March 20, 1917;
- Two and one-quarter per cent to stockholders of record on May 28, 1917, payable on June 20, 1917;
- Two and one-quarter per cent to stockholders of record on August 28, 1917, payable on September 20, 1917;
- Two and one-quarter per cent to stockholders of record on November 27, 1917, payable on December 20, 1917.

#### COAL MINING DEPARTMENT.

The anthracite produced by this company during 1916, including the product of washeries, aggregated 7,186,380 long tons, a decrease of 914,387 below 1915. The year's output was 10.67 per cent of the total output of all Pennsylvania mines and washeries, which was 67,376,364 long tons. The number of breaker hours required for the preparation of the company's coal was 51,341. Cost of production was unfavorably affected by the increase in wages, the reduction in the number of hours per day and the increased prices of materials and supplies.

#### LABOR.

The agreement with the employees, which took effect on April 1, 1912, terminated on March 31, 1916, and, after extended negotiations, a new agreement was consummated on May 5, 1916, effective on April 1, 1916, extending for a period of four years from that date, that is, to March 31, 1920. The main points in the new agreement are:

- (1) A change in the length of the working day from nine to eight hours.
- (2) An increase of seven per cent in contract rates, i. e., the rates paid for the work of miners and their laborers in cutting and loading coal, handling rock, etc.
- (3) Payment to employees paid by the day or hour an aggregate of three per cent more for working eight hours than they previously received for working nine hours. This is equivalent to an increase in the rate of pay of such employees of nearly sixteen per cent.
- (4) Determination of method of arriving at rates of pay of employees working in connection with machine mining.
- (5) A stipulation that the prices of powder and miners' supplies shall be continued during the life of the agreement without change.

Like all agreements effected since 1902, this one provides an orderly method for the settlement of all questions arising and that, pending resort to that method, work shall not be interrupted by a strike. The ineffectiveness of such agreements has been again demonstrated. The new agreement was consummated, as previously stated, on May 5, 1916. From January 1 to May 4, inclusive, there had been four strikes involving a loss of 202

colliery-hours or, on an eight-hour basis, 25½ colliery-days. From May 5 to December 31, inclusive, there were twenty-two strikes involving a loss of 1,190 colliery-hours or, on the same basis, 148½ colliery-days. During the whole year there were twenty-six strikes with a total loss of 174 colliery-days. Prior to May 5, there was an average of one strike for each thirty-one days and the average loss therefrom was 1.61 colliery-hours per day; on and after May 5, there was one strike for every eleven days and an average loss of 4.94 colliery-hours per day.

The reduction in the hours of labor accentuated the labor shortage which, even without the reduced hours, would have been seriously felt. This, with the failure of the usual supply of immigrants, upon which the miners regularly depend for the ordinary replenishment of the ranks of their laborers, and the extraordinary number of withdrawals due to the unusual rates of wages offered in munition works and other industries, so decreased the number of men employed and available as materially to affect the output. The number of men engaged in the primary labor of production, that is, the miners and miners' laborers employed in cutting down coal and loading it in mine-cars, fell off from 9,752 in January, 1916, to 6,967 in November, a decrease of 28.56 per cent. But in January the standard day involved nine hours of effort, in November only eight hours. The difference between 9,752 men working nine hours and 6,967 working eight hours is a reduction from 87,768 hours per day to 55,736 hours per day, a decrease of 32,032 hours or 36.50 per cent. In this situation the unwise of the "Miners' Certificate" law, by which it is made unlawful to employ as a miner any person who has not had two years' experience in the coal mines of Pennsylvania, must be apparent to all. This law makes it impossible to employ as miners men who have acquired skill and experience in other mines of Pennsylvania or in other States or in foreign countries. There is no such restriction upon the employment of miners in the bituminous coal mines of Pennsylvania or elsewhere. Consequently new men of experience seldom remain in the anthracite mines, and the records show that seventy-five per cent of those who begin in these mines leave within the first year, many of them going to bituminous coal mines, in the same State, in which no period of apprenticeship is obligatory. The "literacy test" imposed by the new immigration law, finally passed over the veto of President Wilson after having failed when vetoed by President Taft, will add to these difficulties.

#### MAINTENANCE AND DEVELOPMENT.

Underground development was carried on throughout the year and the property was fully maintained.

On December 2, 1916, the breaker at Plymouth No. 3 colliery burned down, and since then the coal mined at that place has been prepared at other breakers.

Economies in breaker operation have been obtained during the year by alterations at Coal Brook, Powderly, Gravity Slope and Von Storch collieries. In addition, alterations were commenced at Olyphant, for the same purpose, which will soon be completed. The alteration in the Olyphant electric plant has been completed, also the power line between Olyphant and Carbondale, connecting at the latter point with the Coal Brook power plant, so that the plants at Carbondale and Olyphant are now able to furnish electric current to Clinton, Coal Brook, Powderly, Jermyn, Gravity Slope, Olyphant and Eddy Creek collieries. Power lines are also in course of construction from Olyphant to the collieries in the Scranton district for use at Marvine, Leggits Creek and Von Storch collieries.

Charges to extraordinary expenses of the Coal department amounted to \$1,336,707.32, as against \$800,379.98 in 1915, as follows:

Sinking shafts and shaft improvements.....	\$20,256.75
Tunnels and openings.....	213,420.01
New engines, new boilers, boiler houses and fittings.....	21,715.25
Rope haulage, slopes, planes and ropes.....	48,142.09
New pumps and pump rooms.....	52,948.98
Electric plants, electric machines, machinery and electric locomotives.....	265,961.33
Improvements to breakers and washeries.....	519,048.45
Miscellaneous .....	195,214.46
	\$1,336,707.32

#### RAILROAD DEPARTMENT.

##### OPERATING REVENUES AND EXPENSES.

The total operating revenues amounted to \$26,634,426, an increase of \$2,846,907, or 11.97 per cent over 1915; revenue from merchandise traffic increased \$1,959,654.89, or 22.30 per cent; from coal traffic \$457,315, or 4.04 per cent; from passenger traffic \$349,721.94, or 12.60 per cent, and from miscellaneous sources \$80,215.17, or 8.79 per cent. The gross receipts from passengers were again less than in the year 1913. The reductions in anthracite rates ordered by the Interstate Commerce Commission took effect on April 1, 1916, and, in consequence, this movement produced \$270,440 less than would have been received at the former rates. If the reductions had been in effect from January 1, the loss would have been \$365,141. Even before these reductions the rates received for anthracite were lower, for any given length of haul, per ton per mile or per car mile (loaded and empty movement being considered) than the average of the rates applicable to other freight.

Charges to operating expenses for the year 1916 aggregated \$18,111,094.72, or \$3,287,469.05 more than in 1915. However, the totals shown in the accounts for 1916 are not directly comparable with those for earlier years for the reason that, in order to meet requirements of the Interstate Commerce Commission, the charges on account of maintenance of equipment were increased, in 1916, by \$355,016.52 to balance credits amounting to that sum to a new reserve for "accrued depreciation" of rolling stock. There were no corresponding charges in 1915, and this amount should be deducted from the total for 1916 before comparing with 1915. Making this exclusion, the comparison shows an increase of \$2,932,452.53, or 19.78 per cent, and \$85,545.53, or 3.00 per cent, more than the increase in operating revenues. With the same deduction, the operating expenses of 1916 amounted to 66.67 per cent of the operating revenues, as against 62.32 in 1915; including the new charges for depreciation of equipment, the operating ratio of 1916 appears as 68.00 per cent. The rise in this ratio was principally the result of (a) the lower average receipts per ton of freight per mile caused by the compulsory reduction in anthracite rates; (b) the continued enhancement of labor costs by means of increase in wages and diminished service per unit of payment, and (c) increases in the prices of necessary materials and supplies. The year's operating expenses were \$1,189,622 greater than they would have been at the wages and prices of 1915; of this aggregate \$427,699 was due to increases in wages and \$761,923 to increases in prices. The upward tendency in prices is still in progress.

Expenses for maintenance of way and structures increased \$275,687.08, or 14.88 per cent, although there was a reduction in the outlay for renewals of ties of \$142,306.45. Aside from an increase of \$50,073.01 in the cost of removing snow and ice, due to unusually adverse weather conditions, the increases were principally the result of the higher cost of labor and materials.

The charges for maintenance of equipment exceeded those of the previous year by \$1,267,537.56, or 34.23 per cent. This increase includes an increase of \$629,813.19 in the cost of repairs to locomotives and freight and passenger cars; higher prices of materials account for \$388,204 of this increase and higher rates of wages for \$235,619. It also includes an increase of \$230,992.38 in the charges on account of retirements of

locomotives, freight cars and work equipment which it was considered undesirable to retain in service and the items for depreciation, previously referred to, aggregating \$355,016.52. These depreciation charges commenced on June 1, 1916, and were thereafter accrued at the monthly rate of one-sixth of one per cent of the original cost of the equipment, the equivalent of two per cent per year. Depreciation charges were not considered permissible, in 1915 and preceding years, for the reason that the values at which your equipment was carried in your accounts had been so heavily diminished, prior to 1907, by arbitrary credits to cost of equipment, that it was, as a whole, carried in your balance sheet as worth very much less than any reasonable estimate of its real value. An independent appraisal completed during 1916, by a committee of thoroughly qualified experts, determined the real value, and as a preliminary to the institution of regular charges for depreciation, there was a charge to cost of equipment of \$2,914,535.18, the excess over the book value, and a credit of the same sum to a depreciation reserve. Although charges for depreciation may tend to recreate a discrepancy between real values and the net book values, it was considered suitable to defer to the wishes of the Interstate Commerce Commission and to begin the regular accrual of a depreciation reserve. Eliminating these depreciation charges, in order to permit a valid comparison (and because the amounts were not actually expended), the real increase in the expenses of maintenance of equipment is seen to have been \$912,321.04, or 24.64 per cent.

Traffic expenses increased \$25,588.21, or 8.10 per cent; transportation expenses \$1,505,944.52, or 18.81 per cent (of which \$643,994.12, or 42.77 per cent, represents the increased cost of locomotive fuel) and general expenses \$181,871.86, or 23.45 per cent (of which \$82,383.75, or 45.30 per cent, represents the added expenses required by the valuation of your company's property which is now being made by the Interstate Commerce Commission under authority of an Act of Congress).

#### OPERATING EFFICIENCY.

The average freight-train load of 1916 was 717.75 tons, an increase of 9.99 per cent over 652.58 tons, the average of 1915, and of 54.54 per cent over 464.45 tons, the average of 1910. Although the number of tons of freight carried one mile increased 20.55 per cent over 1915 and 39.77 per cent over 1910, there was an increase in the number of miles run by freight locomotives of only 13.70 per cent as compared with 1915 and of only 5.44 per cent as compared with 1910.

#### SO-CALLED "FULL CREW" LAW.

The so-called "full-crew" laws, in effect in Pennsylvania since July 15, 1911, and in New York since September 1, 1913, added \$172,859.49 to the operating expenses of the year without obtaining any service to the public or to the company. Of this total \$42,975.98 was incurred by reason of the Pennsylvania statute and \$129,883.51 was due to that of New York. The total compares with \$143,561.66 and the respective items with \$36,859.95 and \$106,701.71 in 1915. The total statute-compelled waste resulting from these laws was, to December 31, 1916, \$612,321.60. Although a supposed relation to safety is the sole excuse for those laws it is a well established fact that barely two per cent of the total casualties on railroads could be even remotely affected by the number of men in the train crews. The legislature of Pennsylvania, which meets only biennially, passed a bill repealing this law at its last session, but it was vetoed by Governor Brumbaugh. The effort for repeal will be renewed at the session of this year. Efforts during the past year to repeal the New York law were without result, but will be continued at the present session.

#### EMPLOYEES IN MILITARY SERVICE.

Certain of your officers and employees were called during the year, as members of the National Guard, into military service upon the Mexican frontier. In all instances of this sort indeterminate leaves of absence were granted and the company assumed the payment to all having dependents of the entire difference between their compensation by the National government and their regular salaries or wages. All others were continued upon the pay-roll at one-half their regular pay. On December 31, 1916, the amounts expended under these arrangements aggregated \$12,368.10, and there remained in the military service twenty-three persons with whom such arrangements were in effect.

#### SERVICE AND WAGES OF TRAINMEN.

A long-continued agitation resulted, early in 1916, in a combination of a very large proportion of all the engineers and trainmen employed in the United States and organized in the "Big Four" brotherhoods and a demand, in the name of this combination, for changes in rates of pay and conditions of service which it was felt were impossible to concede. The engine and train employees of your company became, to a considerable extent, parties to this combination and to the ensuing demand. Although these demands, if agreed to, would not have reduced the length, in hours, of any trip or the day's employment of any employee, the movement falsely masqueraded as an attempt to place the labor affected on an eight-hours per day basis and gained some emotional support by means of the deception. It would be superfluous at this time to describe the extended negotiations conducted by representatives of the combination of labor organizations, on the one hand, and a committee representing most of the railroads affected, on the other, all failing to result in a settlement. The Federal authorities, acting in accordance with the Newlands act, also failed to induce an agreement, and, after the President of the United States had commanded the attendance in Washington of representatives of both the employees and the railroads, he informed the latter that the employees had definitely refused to become parties to arbitration in any form or by any tribunal. This refusal was especially surprising in view of the fact that the provisions for arbitration in the Newlands act were originally formulated at a conference between representatives of the employees and the railroads and its passage was urged upon Congress by the President at their recommendation. At all stages of this difference your company and all other railroads involved were willing, and made their willingness known by repeated offers, to submit it to any form of impartial arbitration, either that provided for by the Act of Congress, known as the Newlands law, by the Interstate Commerce Commission, or by a special tribunal to be selected by the President or in such manner as he might direct. The uncompromising attitude of the labor representatives was not modified until Congress enacted the measure now known as the "Adamson" law. With the enactment of that measure the order for a general strike, which had been issued even while the President was still seeking to effect a compromise, was withdrawn.

The Adamson law fixes eight hours as the standard day, for purposes of payment and without placing any new restrictions upon the number of consecutive hours of duty, and temporarily, for a period which cannot continue after October 30, 1917, prohibits any less payment for the new standard day than the standard day's wages in force when it was enacted. By a command that will also expire with the same period, it requires *pro rata* payments for all time in excess of eight hours. Counsel advised that this statute was of doubtful constitutionality and, in view of the large additional expense and the serious operating problems which it would entail, it was considered necessary to secure a judicial determination before assuming these additional burdens. To that end, numerous suits were brought, including one by your company; a test case was finally selected by agreement with the Attorney General, and it was agreed that, pending a decision, the Federal authorities would refrain from efforts to enforce the contested statute and the railroads would keep accounts that would enable them, should the statute be sustained, to pay at the new rates for

all services rendered on and after January 1, 1917, its effective date. The test case was taken promptly to the Supreme Court, was argued on January 8, and on March 19, 1917, a judgment was rendered, sanctioned by the opinion of five of the nine members of the Court and over the dissent of four, sustaining the Act of Congress.

This decision sustains the authority of Congress to settle disputes among those engaged in the operation of interstate railways, so far as such disputes interrupt or threaten to interrupt interstate commerce, by resort to compulsory arbitration and declares that railway employees who have voluntarily engaged in such commerce have thereby so far subjected themselves to public control that Congress may prohibit united action on their part which would interfere with the orderly movement of interstate passengers and freight. In other words, the power of Congress is held to be sufficient to prohibit conspiracies and strikes in interstate railway commerce.

The situation created by the leaders of the "Big Four" brotherhoods on the very eve of this decision demonstrates the need of Congressional legislation giving practical and permanent expression to this authority. For a week before the decision was rendered these leaders threatened a general railway strike, and even after President Wilson had made an appeal, supported by representations of extreme national exigency, to patriotism, their purpose to strike was reiterated, until, only a few hours before the Court spoke the railway officers concluded that their duty to the Nation required them to make concessions that would have been permissible under no other conditions. It is earnestly hoped that, with this extreme object lesson in view, Congress will not permit the brief mandate of the Adamson law to expire without first having empowered the Interstate Commerce Commission to hear and determine all disputes concerning wages and conditions of employment and prohibiting all concerted action to interfere with the free movement of interstate railway commerce.

The Adamson law provides for an official inquiry concerning the results of the system which it imposes, including the new scale of wages, and a commission consisting of Major-General George W. Goethals, lately in charge of construction and operation of the Panama Canal; Honorable Edgar E. Clark, of the Interstate Commerce Commission, and Honorable George Rublee, formerly of the Federal Trade Commission, has been named to make the investigation. It will be shown to this Commission that the advance in wages required by the new law involves an addition of more than \$50,000,000 per year to railway expenses, and that unless the wages rates are to be reduced at the end of the compulsory period, the railways must be provided with additional revenue sufficient to meet this added drain upon their resources.

#### TAXES.

The burden of taxation grows heavier with every year. With net operating revenue diminished, as compared with 1915, by the sum of \$440,562.05, the taxes exacted by the various authorities to which your railway property and earnings are subject increased \$76,335.36, or 11.22 per cent. The taxes of 1916 absorbed 8.88 per cent of net operating revenue, which compares with 7.59 per cent in 1915. Comparing 1916 with 1907, the later year shows an increase in net operating revenue of \$52,319.94, or less than two-thirds of one per cent, and taxes show an increase of \$403,588.73, or 114.37 per cent; the increase in taxes thus amounting to nearly eight times the whole increase in the fund out of which interest on indebtedness and compensation for the use of capital, as well as taxes, must be paid. The increase in the amount invested, during the same period was 26.59 per cent. The following table shows the total tax payments of each of the last ten years and the absolute and relative increases for each year since 1907 and for the whole period:

Year.	Taxes Paid.	Increase Over		Increase Over 1907.	
		Next Year.	Previous Year.	Amount.	Per cent.
1907.....	\$352,866				
1908.....	413,029	\$60,163	17.05	\$60,163	17.05
1909.....	411,469	1,560*	.38*	58,603	16.61
1910.....	497,408	85,939	20.89	144,542	40.96
1911.....	567,410	65,902	13.07	209,544	59.38
1912.....	600,944	38,534	6.85	248,078	70.30
1913.....	623,107	22,163	3.69	270,241	76.58
1914.....	671,119	48,012	7.71	318,253	90.19
1915.....	680,119	9,000	1.34	327,253	92.74
1916.....	756,455	76,336	11.22	403,589	114.37

\*Decrease.

The United States and the states of New York, Pennsylvania and Vermont, severally possess and exercise power to exact taxes which must be met out of the net operating revenues of your railway property. The Federal taxing power was temporarily applied to the railways during the Civil war and, again, during the Spanish-American war, but prior to 1909 it was not the policy of the United States to draw from railway earnings any part of its ordinary revenues in times of peace. The emergency taxes of the first period were abolished in 1874 and those of the second period in 1902. The Act of Congress of August 5, 1909, provided for an annual tax of one per cent upon the net annual income in excess of five thousand dollars of all corporations doing business in the United States, including railway corporations, this being the first Federal statute adopted during a period of National peace which placed a tax directly upon railway property or revenues. This one per cent income tax was re-enacted, without the five thousand dollars exemption and without the restriction to corporations actually doing business, as a part of the Act of Congress of October 3, 1913. By the Act of September 8, 1916, the rate of this tax was doubled and the new rate was made to apply to the tax to be paid with reference to the income of the year that ended with December 31, 1916. In addition, this company is required, by the contracts under which certain of its bonds and debentures were issued, to pay interest without deduction for any tax on such interest which it is required to withhold and pay. The Federal authorities have held, so far without effective objection, that railways are required to withhold and pay, on account of those of their individual bondholders who have taxable incomes, one per cent of the interest falling due on corporate bonds, whether registered or coupon bonds, and the inquiry whether this is a tax of the character intended by the "tax free" clauses has been held in abeyance. Therefore, a part of the income tax nominally laid upon the holders of your company's bonds has, in fact, been borne by the company. If this continues, the amount thus exacted will be practically doubled owing to the increase of the "normal" tax from one to two per cent. Again, under the Act of Congress of October 22, 1914, and the joint resolution of December 17, 1915, the Federal government required bills of lading and sundry other documents, more or less regularly necessary in the business of your company, to bear internal revenue stamps, which had to be provided either at its expense or that of those with whom it had transactions or for whom it performed services. These stamp taxes were repealed by the Act of September 8, 1916. The latter Act has, however, provided a new tax which will have to be met out of the revenues of 1917. This is coming to be known as the "capital stock tax," and is defined in the statute as "a special excise tax with respect to the carrying on or doing business." This tax is to be at the rate of "fifty cents for each \$1,000 of the fair value" of the capital stock, and "in estimating the value of capital stock the surplus and undivided profits shall be included." There is an exemption in every case, of capital stock to the "fair value" of \$99,000. To these new forms of taxation the in-

genuity of the lawmakers in devising means to obtain largely increased governmental revenues at the expense of industry, while preventing general realization of the magnitude of the burden laid upon production, has just now added yet another and especially burdensome Federal tax. The new measure lays a tax of eight per cent upon all corporate income which exceeds five thousand dollars in addition to eight per cent of the amount invested in the corporate business, exclusive of amounts obtained by the issue of bonds or other evidences of indebtedness. Interest on bonds or other indebtedness is to be deducted before the statement of corporate income, subject to the limitation that the total of such indebtedness shall not be more than double the par value of the capital stock. As the legal rate of interest is not less than six per cent in any state and is eight per cent in some, it will be seen that this tax will directly and heavily penalize productive efficiency. Although it is very many years since any considerable American railway has in any twelve-months' period earned as much as eight per cent upon the value of the property used by it in the public service, this tax will fall heavily upon some railways whose credit formerly permitted the borrowing, at relatively low rates of interest, of considerable portions of the capital used.

#### FEDERAL VALUATION.

Engineering parties representing the Division of Valuation of the Interstate Commerce Commission have been engaged in field work connected with the valuation of your railway property since July 1, 1916. Your own Valuation Department is co-operating fully with the Government, and is taking all proper measures to facilitate a just valuation. The cost of this inquiry to this company during the year 1916 was \$123,750.46, and during the four years 1913 to 1916 it caused a total expenditure of \$198,313.26.

Governmental appropriations for this work for the period to end with June 30, 1917, aggregate \$9,300,000. In a recent statement to the Appropriations Committee of the House of Representatives the Director of Valuation of the Interstate Commerce Commission said that with annual expenditures of \$3,500,000 the field work could be completed in the year 1920, making a total cost on June 30, 1920, of \$19,800,000. (These figures as to cost and time compare strangely, it may be remarked in passing, with the original official estimate of "not less than \$1,750,000," as the total cost, and eighteen months, as the probable duration of the work.) The cost to the railroads, to June 30, 1916, was \$9,525,781.69, of which \$5,102,340.79, or 53.56 per cent, was expended during the last year of the period. The annual cost to the railways is rapidly increasing for the reason, among others, that the public authorities in charge are very ingenious in finding ways to force the railways to bear the heavier burdens of cost. At the minimum, the cost to the railways of this work will be double that of the Government, or not less than \$39,600,000. This would give a total cost of \$59,400,000, a sum which is pretty certain to be considerably exceeded. The railroads welcomed this valuation, in confidence that it would set finally at rest all questions as to the integrity of the statements of cost of road and equipment upon their books and forever put an end to charges of over-capitalization. It is, therefore, with surprise and disappointment that it is found that the moment that the initial results seem likely soon to become available, representatives of a number of state railroad commissions adopt an attitude antagonistic to statements of value by the Federal commission, arguing that no authority to determine a valuation is conferred by the Act of Congress and that all the Interstate Commerce Commission is empowered to do is ascertain facts concerning the quantities and prices of the land, material and labor represented by the railway properties which are investigated. This would leave the actual duty of valuation to some undefined and unknown agency to be performed at some time not fixed. To cause an expenditure of nearly \$60,000,000 with so slight a purpose and result would be such extravagant trifling that, even were the Act ambiguous, and it certainly is not, it could not be regarded as the extent of the Congressional intent. The Interstate Commerce Commission has taken the argument of the representatives of the State Commissions under advisement, but it is hoped that it will not find in it any real obstacle to the execution of the manifest purpose of Congress.

The Interstate Commerce Commission has reported the average par value of the securities outstanding against each mile of the American system, the most efficient railway agency of land transportation anywhere existing, as of June 30, 1914, as \$66,661. This average ought to be compared with the following figures based upon data in the latest available issue—1915—of the *Archiv für Eisenbahnen*:

Railways of	Miles Represented.	Average Capitalization Per Mile.
England .....	23,436	\$284,805
Belgium .....	2,705	199,505
France .....	25,236	152,776
Switzerland .....	3,055	136,694
Italy .....	8,699	130,041
Austria .....	14,216	126,949
Germany .....	38,155	126,099
Russia .....	41,811	87,990
Netherlands .....	1,653	86,787
Spain .....	9,076	83,348
Hungary .....	13,332	74,557
Average .....		\$136,779

The average for Europe, more than double that for the United States, represents railways, all of which are far inferior in capacity and efficiency to those of this country. Moreover, they charge far higher rates and pay far lower wages.

#### RAILWAY MAIL PAY.

Since last year's report there have been material changes in the difficult and unsatisfactory situation with regard to the transportation of the mails. By provisions contained in the Postal Appropriations Act, of July 28, 1916, Congress transferred to the Interstate Commerce Commission, subject to only slight restrictions, the whole duty to fix the standards of service and the units and rates of payment. Pending this determination, the Postmaster General was authorized to make experimental changes in the basis of payment, and he has construed this authorization as empowering him to change substantially the whole service to the "space basis" which he has long advocated. This action was taken to go into effect on November 1, 1916. The "space basis" is objectionable to the carriers because it is variable and indeterminate and makes helpful comparisons with other railway services impossible. There are many reasons why it should be objectionable to a government wishing to render satisfactory postal services and to deal fairly with the railways essentially assisting therein. Moreover, the Postmaster General claims the right to demand without compensation certain services, which this company among others is now rendering under protest and with notice that it will seek to recover proper remuneration, of mail messengers, return of space needed in one direction only, handling of mail on trains and in stations and transportation of public officers and employees. Owing to the broad powers accorded to the Interstate Commerce Commission, these obnoxious conditions need not continue. The Commission has had abundant opportunity to learn, and must be assumed to know, that the passenger-train service of nearly all American railways fails to produce anything like reasonable returns. It must, therefore, be expected that the Commission will not hesitate at the drastic action necessary in order to place the portion of that service thus

transferred to its immediate control upon a sound and properly remunerative basis.

In 1907, the Postmaster General, by an executive order changing the method of calculating the average daily weight of the mails carried on each railway route, then and until last November the basis of payment, brought about an heavy reduction in the mail pay of every railway. This action was considered of very doubtful legality and led to the accumulation of claims against the Government having an aggregate of several millions of dollars. Test cases were presented in the Court of Claims of the United States, and the original decision was favorable to the railways, but a rearrangement was ordered which resulted in a second opinion and a contrary decision. The railways directly involved appealed to the Supreme Court which has just divided equally on the question, one of the justices being unable to sit in the case because of former connection with it as Attorney General of the United States. The effect of this division is to affirm the adverse judgment of the Court of Claims as to the particular cases presented to the Court but without constituting an authority as to any other claims.

#### INDUSTRIAL DEPARTMENT.

During 1916, one hundred and ten new manufacturing or commercial establishments located on the tracks of your company, as compared with ninety-three in 1915. The freight received from these new enterprises is estimated as 695,615 tons, and the revenue accruing to your railway therefrom as \$845,082. The efforts of the Industrial Department to obtain new industries and to assist and stimulate the industries already served, to the end that the regions reached by your railway lines shall develop in industry and prosperity, are continuous. Efforts to promote the location of public and private camps in the many especially attractive regions to which access is by means of passenger service over your rails have produced excellent results and will be continued.

#### ADDITIONS AND BETTERMENTS.

Renewal and strengthening of bridges on the main line to permit the use of heavier locomotives was continued during 1916. The total expended on this work, to December 31, 1916, was \$423,092.46, of which \$173,181.64 represents additions to the capital invested, and \$249,910.82 was charged to operating expenses. Expenditures for reinforcing abutments and similar work in connection with this program aggregated to December 31, 1916, \$90,258.70, of which \$61,253.55 was charged to cost of property and \$29,005.15 to operating expenses.

At Fonda avenue, Oneonta, N. Y., a new steel foot bridge has been erected to carry pedestrians over your tracks, at a cost of \$19,054.91, and at Butler street, Wilkes-Barre, Pa., a new viaduct was built by the city authorities. Your company's proportion of the cost of the latter, chargeable to cost of property, was \$22,386.02. The elimination of three grade crossings in the towns of Castleton and Poultney, Vt., mentioned in the last report, is in progress, and there has been expended thereon, to date, \$15,035.25, your company's proportion being sixty-five per cent. The elimination of the grade crossing at South Main street, Bainbridge, N. Y., was completed during the year at a cost of \$31,964.36, of which \$15,982.18 was paid by your company. To improve highway crossing conditions, an agreement has been made with the town of Colonie, N. Y., to relocate the Spring street crossing, adjacent to your Colonie shops, at an estimated cost of \$15,035.

In order to reduce curvature, realignment of the track south of Altamont, N. Y., and construction of a new concrete arch to take the place of the old bridge No. 19, have been authorized at an estimated cost of \$65,855, of which \$12,759 will be chargeable to cost of property and \$53,096 to operating expenses. The reduction of grade of the main-line track at Unadilla, N. Y., with certain changes to Bridge No. 79, has been authorized at an estimated cost of \$28,700.

Revision of grades on the northbound main-line track between Worcester and Richmondville Summit has been started and there has been expended to date \$45,303.80, of which \$44,382.78 was charged to cost of property and \$921.02 to operating expenses. A new, northbound, third track, about eight miles in length, is under construction from Schoharie Junction to Delanson, N. Y., on which there has been expended to date \$154,477.01, of which \$151,823.67 has been charged to cost of property and \$2,653.34 to operating expenses. Together, these improvements will have the effect of reducing the maximum grade against northbound traffic between Oneonta and Delanson and Mohawk Yard to eight-tenths of one per cent.

The construction of extensions to passing sidings and general improvements at Schenectady, N. Y., mentioned in the last annual report was completed during the year at a total cost of \$29,780.12, of which \$28,342.25 was charged to cost of property and \$1,437.87 to operating expenses. To facilitate the handling of the large increase in business at Plattsburgh, N. Y., resulting from the establishment of the United States government military training camp, the construction of two additional side tracks was authorized at an estimated expenditure of \$14,077.

The removal of the Anthracite Park coal plant to a new location at Duffy's Field, south of Carbondale, to make room for the extension and the enlargement of the Carbondale yard, was completed during the year and the capacity of the plant was enlarged, the total cost being \$366,486.40. A new chute was installed and other general improvements made in the cold storage plant at Glenville, N. Y., during the year at an expenditure of \$12,848.30, of which \$12,598.88 was charged to cost of property and \$249.42 to operating expenses. In order to provide additional coal storage facilities for handling locomotive fuel, a new 120,000-ton coal storage plant, with necessary appurtenances, has been authorized to be built at Oneonta, N. Y., at an estimated cost of \$65,700. To facilitate the handling of coal at Olyphant, Pa., the purchase of two 110 ft. steam cranes has been authorized at an estimated cost of \$57,000.

The development of the yard at Carbondale, Pa., mentioned in previous annual reports, was continued during 1916, and \$52,401.26 was expended thereon during the year, of which \$52,279.77 was chargeable to cost of property. An addition to the northbound classification yard at Oneonta, N. Y., has been authorized at an expenditure of \$12,000. Improvements were made during the year to the yard at Sidney, N. Y., including the construction of a new tool house and a blacksmith shop, at a total cost of \$4,587.17, of which \$4,383.19 was charged to the cost of property and \$203.98 to operating expenses.

Construction of a new platform and changes in track facilities, at a cost of \$8,250, to improve transfer facilities at Mechanicville, N. Y., where interchange of freight is made with the Boston & Maine Railroad were authorized. Construction of a new passenger station and improvements to freight house and track facilities at Poultney, Vt., have been authorized at an estimated expenditure of \$17,000.

To properly care for heavier power, improvements have been made to the roundhouses at Oneonta and Carbondale, amounting to \$24,805.64, of which \$23,048.49 was charged to cost of property and \$1,757.15 to operating expenses. Water facilities were enlarged during the year by the erection of a new 50,000-gallon tank at Port Henry, N. Y., and new tanks and new standpipes at Saratoga, N. Y., and Saranac Lake, at a cost of \$8,585.86, of which sum \$6,977.51 was charged to cost of property and \$1,608.35 to operating expenses.

An addition to the office building at Albany has been authorized at an estimated cost of \$260,000.

The equipment of one thousand forty-ton capacity gondola cars with steel underframes, at a total estimated cost of \$546,092, is now in progress. Sides and ends have been applied to three hundred wooden-frame, plat-

form cars and two hundred steel underframe flat cars, to convert them to flat bottom gondola cars for coal carrying, at a cost of \$18,138.86, all of which was charged to cost of equipment.

The twenty-four new steel passenger cars, mentioned in the annual report for 1915, and two one hundred-ton capacity steel flat cars, for use in transporting heavy guns, have been built and paid for from funds accumulated under the First Lien Equipment Trust Indenture, and put into service.

Sixteen combination baggage and mail cars have been equipped with steel underframes to comply with the law that wooden cars shall not be operated between steel or steel-underframe cars, or between such cars and the engine. Three more are to be reconstructed at Oneonta shops and three new cars of the same class are being built by the Pullman Company.

By a law of New York, all cabooses must be equipped with eight wheels and steel underframes by July 1, 1920. Of a total of 208 cars, thirty-four have been equipped as provided by the law and fifty are on the 1917 program; the work will continue until completed.

The equipment of freight cars with the standardized safety appliances approved by the Interstate Commerce Commission is required to be complete by July 1, next. Of a total of 18,948 cars, 17,572, or 92.74 per cent, have been completed. It has also been ordered that all locomotives shall be equipped with electric headlights, before January 1, 1920.

#### GENERAL REMARKS.

The railway industry continues to be affected by the abnormal economic conditions created by the European war. Many of the changes effected are of stupendous magnitude. For example, the excess of the value of United States merchandise exports over imports for the two years and seven months from July 1, 1914, to January 31, 1917, was \$5,496,030,491, which may be compared with \$5,631,183,343, the corresponding aggregate for the twelve years from July 1, 1902, to June 30, 1914. If the last five months of the present fiscal year show an increase over the corresponding months of the previous year proportionate to that of the first seven months, the trade balance for the three years ending with June 30, 1917, will reach \$7,687,043,312. The total value of imported and exported merchandise for the calendar year 1916, was \$7,873,077,924, an increase of 84.10 per cent over \$4,276,614,772, the total for 1913. The increase in imports was \$599,057,855, while exports of goods of domestic origin increased \$2,972,984,685, or 121.43 per cent, from \$2,448,284,477 in 1913 to \$5,421,269,162 in 1916.

The effect upon the movement of gold was not less marked. For the calendar year 1916, the excess of gold imports over exports was \$530,197,307, and for the previous year \$420,528,672, a total for the two years of \$950,725,979. This aggregate is to be compared with an excess in the opposite direction, that is of gold exports over imports, for the previous two years of \$193,322,193.

In addition to the enormous volume of gold thus sent to the United States, a large aggregate of American securities held, at the beginning of the war, by European investors, have been resold in this market. Of railway securities alone, the par value held abroad on January 31, 1915, six months after the commencement of the war, was in excess of \$2,704,402,364. During the ensuing two years, that is, to January 31, 1917, no less than \$1,518,590,878 or 56.15 per cent of these securities passed into American ownership. The market value of the railway securities held abroad on January 31, 1917, had been reduced to \$924,542,646. Data with regard to other kinds of securities are less complete but it is known that between December 31, 1914, and September 30, 1916, the foreign holdings of the stock of the United States Steel Corporation decreased from 1,193,064 shares of the common and 309,457 shares of the preferred to 537,809 of the former and 171,096 of the latter, reductions of 54.92 and 44.71 per cent, respectively.

The total of the foreign loans placed in the United States during the two years that ended with December 31, 1916, is stated as \$2,656,000,000, of which \$1,381,000,000 was the total for 1916.

Not less significant in an economic sense, is the almost complete cessation of the flow of immigration, on which the United States has depended for a very long period to supply a large fraction of the immense total of manual labor essential to its industrial activities. The excess of alien immigrants over emigrants in the fiscal year 1914, was 915,142, a figure fairly representing the annual flow of the period just prior to the war. The corresponding figure for the fiscal year 1916 was 169,061 and for 1915 it was 122,626. Thus the decrease from 1914 to 1915 amounted to 86.60 per cent and from 1914 to 1916 to 81.53 per cent.

The extreme stimulation of productive activities, primarily due to the unparalleled expansion of export demand and the accompanying increase in both foreign and domestic trade, required numerous and rapid adjustments and readjustments not all of which could have been expected to be made without friction and difficulty. At the present time, the diversion of vessel tonnage from domestic transportation has suddenly thrown upon the railways traffic ordinarily moved over water routes. Trans-continental traffic by rail was suddenly swollen by the interruption of traffic via the Panama canal and the condition has been continued because many of the boats find greater opportunities in trans-Atlantic or trans-Pacific trade and because of the extraordinary export movement via Pacific coast ports of locomotives, cars, rails, munitions and other commodities destined to Russia. Similarly, the decreased vessel tonnage, in the Atlantic seaboard coastwise trade, has stopped the normal movement of lumber by water and as the South is the source from which nearly all the cross-ties for the eastern railways must be obtained, their movement by rail has been unavoidable. For the same reason there was, during the year, a shortage in the volume of coal reaching Boston by water. As the coal requirements of Boston actually increased the railways were required to carry a large excess over the normal quantity of coal destined to that port. The tonnage distributed by one railway increased, in 1916 as compared with 1915, more than one million tons, or over one-sixth, but the tonnage received by water, included in its total, decreased about 640,000 tons, or more than one-fifth. This involved an increase of fifty per cent in the tons moved by rail, and probably more than doubled the number of tons carried one mile. Other New England ports were affected in the same manner. The Interstate Commerce Commission required the railways reaching ports of the Great Lakes to dispose of the boats which they had operated to and from such ports and this, together with withdrawals from the lake service for other reasons, greatly diminished the tonnage available for the movement of coal via the lakes and threw a corresponding burden upon the rail routes. Moreover, the extraordinary conditions in the steel trade made it seem desirable to the owners of much of the tonnage which, in the past, has carried iron ore southward and coal northward, to refuse the coal tonnage and to send the boats without cargoes on their returning northward-bound trips, in order to save the few days required for loading and unloading coal. At the same time export traffic has concentrated upon the northern Atlantic seaports, particularly upon New York and Boston, because the scarcity of bottoms in foreign trade, even after the diversion thereto of many ships formerly in coastwise trade, and the high trans-Atlantic rates, has made it more profitable to operate over the shorter routes and has caused still greater scarcity of tonnage at the Gulf and south-Atlantic ports. The merchandise traffic moving to Boston by rail has increased about 50 per cent. Other sources of extraordinary demand for railway services have been numerous and may be illustrated by a few examples. Canadian industries have been abnormally active and it has been necessary for many manufacturers and for the Canadian Pacific Railway to obtain fuel from the United States, this export demand involving an unusual rail movement.

The closing of the ordinary European sources of the supply of many articles sold largely in the United States has impelled extensive importations of similar articles from China and Japan, thus requiring a long trans-continental movement by rail but without relieving the eastern railways from participation in the distribution. Extensions of many American factories and mills, notably in the Pittsburgh district, where railway congestion has at times been severe, have taken up lands formerly allotted by the owners of the plants to the storage of coal, and no other land being available, these establishments have been forced to a "hand-to-mouth" practice, which requires daily deliveries and places the heaviest possible strain upon railway equipment and motive power. The movement of troops to and from the Mexican border and of the munitions and supplies required have also constituted an extraordinary and adverse element in the situation.

Notwithstanding these extraordinary demands upon railway facilities, it is believed that no appreciable congestion of traffic has occurred which is not wholly attributable to misuse of cars and terminals brought about by the conduct of shippers and consignees in matters which the railways are unable to control or are not permitted to control.

The initial difficulty arose out of the contracts covering manufacturers of munitions of war for export. These contracts commonly required payment to be made when the products were loaded on cars at the producing establishments, and the extraordinary efforts to obtain early payments on the part of manufacturers whose working capital was, in many instances, seriously over-taxed by the sudden expansion of activity led to loading that had no regard to the ability of the consignees at seaboard points to receive the goods or to provide for their early trans-shipment. This was the source of the first congestion which was confined almost wholly to seaboard points. Relief was afforded through the co-operation of the Interstate Commerce Commission, represented by Commissioner E. E. Clark, which authorized a reduction in the "free time" allowed for unloading cars at the Atlantic seaboard and, for a period of six months, an increase in the charges for demurrage.

A second and more serious movement also had its origin in the abnormal export trade in war materials. Manufacturers with huge contracts found themselves under the necessity of rapidly multiplying the size and capacity of their plants and became acutely anxious over the sudden demand for machinery, building materials and, especially, for the raw materials out of which to fabricate the products they had contracted to deliver. A wild scramble for materials ensued, in which manufacturers not only bid avidly for supplies to meet their necessities for the ordinary periods in advance, but sought to provide for anticipated needs running much farther into the future. The next step in this process might easily have been foreseen. The situation attracted the attention of speculative adventurers who, having no real connection with the production of any commodities and no actual requirements for raw materials to satisfy, concluded that by contracting for the control of such materials and thus holding them out of the market until the actual necessities of the manufacturers caused them to bid higher prices, they would probably realize handsome profits. Such speculation in commodities became very active and general; it was especially active in the case of fuel, and it soon extended to food products. At one time, when there was a shortage of bituminous coal in the Chicago market, there were several thousand cars of that fuel being held in railway yards at that point in the expectation of higher prices. Similar conditions existed at Detroit, New York and elsewhere. Montreal supplies illustrations of the speculative withholding from the market of food products, ninety cars of potatoes having been held there for approximately three months and two carloads of celery being held until freezing compelled dumping them into the river. The results of such misuse of equipment first penalized those who had no part in bringing them about, including the railways, and, in their reactions, worked to the injury of those by whose conduct they were produced.

Such situations disclose the ability of shippers and consignees to impede the economical use of railway cars and terminals at its worst, but that ability exists at all times, for it is inherent in relationships between the purveyors and the purchasers of railway services, which relationships have so far the sanction of public authority that the railways are powerless to protect themselves or the public. It will be remembered that the Interstate Commerce Commission, in refusing to permit the railways in Official classification territory to put in force, in 1914, the rate adjustments which they regarded as necessary to protect their net corporate incomes on account of the increased cost of labor and materials, made a series of suggestions which, if carried out, would have restricted such abuses of equipment and added something to the revenues of the carriers. The railways accepted these suggestions in good faith and, as soon as practicable, issued tariffs putting them in force, but substantially all these tariffs were suspended by the Federal or the State commissions and the attempted reforms came to naught. Such abuses as those here described could be greatly curtailed by adjustments in demurrage rates and by sufficient control of the use of negotiable bills of lading to prevent their issue in respect of shipments to consignees not in a situation to receive them.

Railway difficulties have been enhanced by the labor situation. The year 1916 was a most inopportune time for the reduction of the effort of any section of the productive labor of the United States, in view of the substantial cessation of the normal flow of immigration and the extraordinary demands of the export trade, yet during the year the whole anthracite industry suffered a change from the nine-hours day to the eight-hours day and effort was reduced in a similar manner in other industries. The scramble of the manufacturers of munitions of war for materials has been paralleled by their scramble, and that of steel manufacturers, for labor; both having sent out emissaries who have successfully solicited many employees of the railways and of the mines to abandon their former employments. Efforts to relieve the railway traffic situation by resort to the power to embargo certain movements were not sufficient because the restriction of movement by one gateway or route usually resulted merely in diversion to another gateway or route until equally severe congestion of the latter resulted.

Any apparent shortage of railway cars or other facilities is abundantly explained by these facts. There was no actual shortage of cars and the appearance of shortage is found, on sufficient analysis, to have been a consequence of a general abuse of cars by shippers and consignees and not to have resulted from a lack of sufficient cars for all legitimate uses. The situation that has received attention has not sprung from any insufficiency in the facilities supplied by the railroads or from methods of operation but from changed and abnormal conditions and misuse of equipment by some shippers and consignees. Railways ought not to be asked to supply cars for warehouse purposes, and if freight equipment is misused in that way so as to be unavailable for the movement of traffic, the blame ought not to be laid upon carriers which have resisted the abuses in all the ways that the legislatures and the commissions have left open to them. For many years the railways have reported to the American Railway Association the number of cars (a) on hand and not required by shippers and (b) requested by shippers in excess of the number supplied.

The data show that during the period of nearly nine years, ending with last August, there was an almost continuous net surplus of freight cars, the only interruptions being in 1909 (about one month), 1912 (about three months), 1913 (about one month). That is to say, there were shortages in five months out of 104; surpluses of idle cars in 99 months out of 104. At one time in 1908 no less than 413,338 cars stood idle for want of traffic; never in 1908 were less than 100,073 cars idle; the surplus of idle cars

rose to 332,513 in 1909, to 142,865 in 1910, to 207,261 in 1911 and was 138,881 in 1912. For two and one-half years, November, 1913, to March, 1916, there was a continuous over-supply of cars, the idle surplus being 279,411 on February 1, 1915 (and 327,084 on April 1, 1915). Moreover, between June 30, 1907, and June 30, 1916, there was not only a great increase in the average capacity of freight cars, but the number of such cars in the United States increased from 1,840,009 to 2,518,855.

It is true, as these data suggest, that if railway facilities are to be adequate to supply without delay the maximum demand for freight movement that may be at any time attained, the revenues of the railways must be sufficient to maintain and to pay interest on the cost of a large reserve supply of freight equipment which will be idle for the greater part of the time. This will be especially true if all reasonable means to prevent detentions by shippers and consignees are not taken. Except the railway industry, no industry is required to be ready at every moment to supply the highest volume of output that may be considered desirable by its patrons. Deferred deliveries are characteristic, in times of intense business activity, of all other lines of productive effort. There are, at this moment, few staple lines of American manufacture in which deliveries before the year 1918 can be contracted for, but the public, including the manufacturers who require the longest periods before delivery, are most restive and complain most vigorously if any railway is temporarily unable to deliver transportation in any volume and upon a moment's notice. Moreover, the manufacturers and all other producers invariably raise their prices when demand presses closely upon or exceeds the immediate supply, acting merely in accordance with a fundamental law of economics. But this law of demand and supply is statutorily restrained in the case of the railways. The ordinary producer, in obedience to this law, raises his prices when demand is extensive and lowers them when it is slight, his action serving to diminish the demand in the one case and to stimulate it in the other, fluctuations of prices, thus constantly operating not only to produce an equation between the demand and the supply, but to insure that the supply is distributed among those the actuality of whose requirements is demonstrated by willingness to pay the higher prices. The railways are denied any such protection but, on the contrary every rise in the prices for other commodities tends strongly to augment the demand for transportation for the very reason that the freight rates are not in adjustment to the higher price-level and the relative cheapness of railway services tends to increase the concentration and localization of special lines of production. The properly abandoned and prohibited system of rebates from the standard rates had, with all its undeniable defects, the single merit, at least, that it provided a most desirable elasticity, and it is most unfortunate that no unobjectionable means to restore that quality to the rate-structure has been discovered. The withdrawal of rebates in times of great pressure for transportation invariably tended to moderate the demand and their resumption or increase in times when equipment was idle tended to stimulate the movement of freight when such stimulation was most desirable. But, as conditions now exist, the stimulation of traffic movement is greatest when most injurious from every public point of view, and the retardation, by a rigid rate-system, is greatest when greater activity of movement is most needed.

Among all American industries, that of railway transportation was in 1914 least in a condition permitting rapidity of expansion. For a decade at least, each succeeding year had brought increased competition for the annual fund of investment seeking capital and in this competition the offerings of municipal governments and of manufacturing enterprises had steadily gained at the expense of those of the railways. Investors knew that the vast aggregate of capital which, since 1907, had been devoted to the improvement and extension of railway facilities, had produced no additional return. They had seen repeated extensions, both by the Nation and by nearly all of the forty-eight states, in the exercise of governmental authority to control railway rates and practices. They had seen the immense power of great combinations of railway employees effectively and frequently applied to the enhancement of wage rates and to the reduction of the labor consideration received in exchange for wages. They had seen heavy increases in the taxes exacted under old systems of taxation and the creation of new forms of taxes sure to fall with especial severity upon the railways. For twenty years they had been unable adequately to adjust their rates to the rapid and great increase in the prices of the materials they require and in the value of the traffic they transport; although the right of adjustment was exercised without hindrance by other producers.

Hence it had come to pass, by 1914, that investors believed that the governmental authorities discriminated against railway enterprises and, in consequence, they had become most reluctant to supply funds for railway uses; new railway undertakings could scarcely be financed save on the credit of existing railways; financing by means of the issue of shares of stock had become impracticable, and even mortgage bonds, when they were available, could be put out only at relatively high rates of interest. The obviously temporary conditions arising subsequent to 1914 have not, especially in view of the relatively enormous increases in the earning power of great manufacturing enterprises, effected any real alteration in this situation.

The changed attitude of investors toward railways, on the one hand, and industries not subject to legislative regulation of prices, on the other, is suggested by comparisons of the average prices of twenty railroad stocks with the average of twenty industrial stocks. The comparisons which follow show the highest averages attained in the years given, those for 1917 being the average for January 3, which were higher than any subsequently attained.

	AVERAGE PRICES		PER CENT OF AVERAGES FOR 1902.	
	Twenty railroads.	Twenty industrials.	Twenty railroads.	Twenty industrials.
YEAR.				
1902.....	\$129.36	\$68.44	100.00	100.00
1911.....	123.86	87.16	95.75	127.35
1917.....	105.76	99.18	81.76	144.92

The foregoing shows that while railway stocks have declined 18.24 per cent of their market value, industrial stocks have advanced 44.92 per cent. Under such conditions it would not have been surprising had railway expansion been greatly retarded. Experiments with public control of prices and rates in the past, and those undertaken by European nations under the stress of the present war, point plainly to the conclusion that while an existing supply can be distributed under maximum prices, there is no provision and little prospect, under such a system, of the replenishment of the quantities consumed, much less of any augmentation of the supply. Nevertheless, the capital for necessary railway development has been obtained and additional mileage has been constructed and additional equipment has been purchased, to the full extent in which there was economic justification. The mileage of terminal and switching tracks has been greatly augmented, bridges have been made stronger and wider, heavier rails have been laid, wooden cars have been replaced by cars of larger capacity constructed of steel or with steel underframes, air-brakes have been installed on freight cars and power-brakes on locomotives and locomotives of greatly increased tractive power have been put in service. These processes of improvement have gone on until today the average freight train load of American freight trains is higher than anywhere else in the world and the typical American freight train is the most perfect and powerful instrument of land transportation anywhere known. Unfortunately, however, the economies in transportation which this costly evolution has procured have been overcome by the enhanced cost of labor and of the materials and

supplies constantly required. Moreover, although existing railway facilities are fully adequate for the actual economic demands of the present, the situation with regard to rates, expenses and credit does not permit much confidence that future requirements can continually be met.

Enough has been said to show that the difficulties which have recently attended the movement of traffic are difficulties which ought only in part to be met by the expenditure of capital. Abnormal and temporary difficulties ought not to be met by increased investments of capital because capital thus added would be likely soon to become idle, too probably permanently idle. But even if the difficulties that have been discussed ought, on other grounds, to be met in that way the obligation would fail because of impossibility of performance. Public authority having been so exercised as to weaken the credit of railway corporations they can no longer obtain new capital upon terms and conditions which the railway industry ought to undertake to sustain; the extremely high prices for railway equipment now ruling would make an excessive volume of capital necessary, and it is now quite impossible to contract for deliveries of cars or locomotives within a period that is not probably considerably longer than that of the future duration of the extraordinary demand for railway services. Relief

must be sought in the proper utilization of the present equipment, terminal and other facilities, and to that end a committee of the American Railway Association is now co-operating with the Interstate Commerce Commission. Your company will conform to any reasonably devised course of remedial action which may be recommended by these bodies.

Attention to this merely temporary situation should not obscure the fact that a great volume of new capital is needed that is not now available. The latest enhancement of the cost of railway labor, with the adjustments that it necessarily entailed and the continuing and rapid rise in the prices of materials and supplies have already further diminished the too-meager margin between railway revenues and railway expenses and, without remedial action, that margin will soon altogether disappear. Such action must speedily be taken or there will be compulsory cessation of railway development and the calamity of inadequate railway facilities will have arrived.

By order of the Board of Managers,

L. F. LOREE,  
President.

### CANADIAN PACIFIC RAILWAY COMPANY—THIRTY-SIXTH ANNUAL REPORT

#### To the Shareholders:

The accounts of the Company for the half-year ended December 31st, 1916, show the following results:

Gross Earnings .....	\$76,717,965.36
Working Expenses .....	45,843,199.50
Net Earnings .....	\$30,874,765.86
Deduct Fixed Charges .....	5,132,551.09
Surplus .....	\$25,742,214.77
Contribution to Pension Fund.....	200,000.00
	\$25,542,214.77
Deduct Net Earnings of Pacific Coast Steamships, Commercial Telegraph, and News Department, transferred to Special Income Account .....	1,144,071.44
	\$24,398,143.33
From this there has been charged a quarterly dividend on Ordinary Stock of 1 1/4 per cent., payable January 2nd, 1917	4,550,000.00
	\$19,848,143.33
From this there has been declared the half-yearly dividend on Preference Stock, of 2 per cent., payable March 31st, 1917.....	\$1,613,638.42
And a second quarterly dividend on Ordinary Stock of 1 1/4 per cent., payable March 31st, 1917 .....	4,550,000.00
	6,163,638.42
Leaving a net surplus for the six months.....	\$13,684,504.91

In addition to the above dividends on Ordinary Stock, one and one-half per cent. was paid from Special Income.

#### THE FOLLOWING ARE THE DETAILS OF SPECIAL INCOME FOR SIX MONTHS ENDED DECEMBER 31st, 1916.

Balance at June 30th, 1916.....	\$10,357,099.09
Less Dividend paid September 30th, 1916.....	1,950,000.00
Interest on Proceeds Land Sales.....	\$8,407,099.09
Interest on Deposits and Loans.....	191,783.02
Interest from Minneapolis, St. Paul & S. S. Marie Ry. Bonds.....	898,068.07
Interest from Mineral Range Ry. Bonds.....	79,860.00
Interest from Montreal & Atlantic Ry. Bonds and other Securities .....	25,080.00
Interest from Berlin, Waterloo, Wellesley & Lake Huron Ry. Bonds .....	36,470.08
Interest from St. John Bridge & Railway Extension Co. Bonds.....	8,520.00
Interest from Esquimalt & Nanaimo Ry. Bonds.....	3,125.00
Interest from Dominion Atlantic Ry. Extension Debenture Stock .....	96,640.00
Interest from Dominion Atlantic Ry. 2nd Debenture Stock .....	28,470.00
Interest from Hull Electric Railway.....	18,493.34
Dividend on Dominion Express Co. Stock.....	20,000.00
Dividend on St. John Bridge & Railway Extension Co. Stock.....	100,000.00
Dividend on Minneapolis, St. Paul & S. S. Marie Ry. Common Stock .....	35,000.00
Dividend on Minneapolis, St. Paul & S. S. Marie Ry. Preferred Stock .....	445,322.50
Dividends on West Kootenay Power & Light Co. Preferred Stock .....	222,663.00
Dividends on Consolidated Mining & Smelting Co. Stock.....	1,925.00
Dividend on Berlin, Waterloo, Wellesley & Lake Huron Ry. Stock .....	178,243.75
Dividends on Toronto, Hamilton & Buffalo Ry. Stock.....	6,250.00
Earnings from Ocean Steamships and Hotels.....	27,553.50
Revenue from Company's Interest in Coal Mine Properties.....	2,546,249.48
Extraneous Mail Earnings.....	182,362.75
Net Earnings of Pacific Coast Steamships, Commercial Telegraph, News Department .....	79,042.85
Received for Space rented in Office Buildings.....	1,144,071.44
	40,158.67
Less:—Payment to Shareholders in dividend: January 2nd, 1917 .....	\$14,822,451.54
	1,950,000.00
From this a dividend has been declared payable March 31st, 1917 .....	\$12,872,451.54

2. The working expenses for the six months amounted to 59.75 per cent. of the gross earnings, and the net earnings to 40.25 per cent. as compared with 55.43 and 44.57 per cent. respectively, in 1915.

3. Under the regulations of the Interstate Commerce Commission, railway companies in the United States are now required to make their fiscal year correspond with the calendar year, and it is understood that at the present Session of the Dominion Parliament similar legislation will be passed with reference to railway companies in Canada. In order to conform to this requirement, which has the merit of facilitating the comparison of the cost of operations and other statistics, your Directors recommend that

December 31st in each year be made the end of the Company's fiscal year instead of June 30th, as heretofore, and with this change in view your Directors have adopted a By-law, which you will be asked to approve, changing the date of the Annual General Meeting of Shareholders from the first Wednesday in October to the first Wednesday in May.

4. You will also be asked to give your sanction to amendments to By-laws Nos. 47 and 49, providing for the issue of the Company's 4% Consolidated Debenture Stock and 4% Preference Stock, in dollar currency denominations as well as in sterling money of Great Britain.

5. The financial reports and accounts now submitted for your consideration cover the six months ended December 31st, 1916, and, therefore, the next Annual Report and statements to be placed before you a year hence will embrace the operations of the calendar year 1917.

6. With the assent of your Company the British Treasury included, among the securities which were being borrowed in Great Britain, the various outstanding obligations of your Company, and these obligations have already been used, to some extent, for the purpose of pledge in New York as security for the obligations of the United Kingdom of Great Britain and Ireland. It became evident, however, that the obligations of your Company, being to a large extent issued in a currency foreign to the American market, could be more advantageously utilized if put in a form familiar to American investors. The need of the British Treasury for securities to obtain dollars has been imperative to carry on the war, and your Company has felt it not only a duty to be of assistance in this situation, but also a privilege, in view of the present position of your Company having been in a large part due to the investment of British capital ever since its formation. No Company in the British Empire stands in higher credit among American investors than the Canadian Pacific Railway Company, and His Majesty's Government had the assurance that your Company's obligations, if offered in a form suitable to the American market, could be readily sold in the United States in large amounts and at a favourable price. Acting under an understanding with your Company, the Lords Commissioners of His Majesty's Treasury have decided to take over or acquire, under their general powers in that behalf, or under regulations made pursuant to the Defence of the Realm Consolidation Act of 1914 and amending enactments, from all persons ordinarily resident in the United Kingdom, their outstanding holdings of Canadian Pacific 4% Consolidated Debenture Stock, Atlantic and North West 1st Mortgage 5% Bonds, Algoma Branch 1st Mortgage 5% Bonds, and Ontario and Quebec 5% Debenture Stock, which the Imperial Government proposes to lodge with your Company in exchange for such an amount of 20-30 year 5% collateral trust bonds of the Canadian Pacific Railway Company in dollar form as will equal, at par, the value, on a 5% basis, of the securities received from the Treasury, calculating the pounds sterling at the rate of £21 to \$100. If all of the above four issues should be acquired and deposited, your Company would issue \$198,979,580 of bonds, payable as to principal and interest in gold in dollars in New York or Montreal at the option of the holder, with a fixed maturity of 30 years, but redeemable at par at the option of your Company on and after the expiration of 20 years. It is also provided that the bonds may be redeemed, if requested by the Government, at 105 and interest, at any time within the first five years of their life. The pledged collateral will be lodged at the specific prices of 80 for the Canadian Pacific 4% Debenture Stock and at par for the above mentioned 5% securities. Under the proposed arrangement the annual fixed charges of your Company will remain as they are at present, interest on the collateral trust bonds being covered by interest on the securities deposited as collateral, and, although your Company is taking liability for repayment on a specified date, that liability is covered by an undertaking of the Imperial Government to provide the funds required for redemption of the bonds in whole or in part during the first five years, or after 20 years or at maturity, as may be determined. Included in the 4% Consolidated Debenture Stock that the Imperial Government proposes to acquire and deposit is the amount of \$40,000,000 recently issued by your Company and loaned to the British Treasury, which the Imperial Government will purchase at 80% of its face value, the proceeds of the sale, namely, \$32,000,000, to be loaned to the Imperial Treasury for a period of five years at an annual interest rate of 5 1/4%, payable semi-annually. The Company was not empowered by existing legislation to issue securities of the character described, and therefore, application has been made to the Dominion Parliament for the requisite statutory authority. As no interest is injuriously affected, and your Company is amply safeguarded, your Directors commend to your favourable consideration and approval the formal agreement between His Majesty's Imperial Government and your Company which will be submitted to you at the Special General Meeting, and ask you to authorize and approve the creation and issuance of collateral trust bonds pursuant to the terms of the agreement, and approve the form of trust deed to be given to secure the holders of such bonds as may be issued, and to do whatever else may be necessary to carry the provisions of the agreement into effect.

7. The sales of agricultural land during the half year were 328,574 acres for \$5,295,345, being an average of \$16.12 per acre. Included in this area were 8,852 acres of irrigated land which brought \$49.78 per acre, so that the average price of the balance was \$15.18 per acre.

8. Acting upon the authority received from you in 1914, your Directors have purchased practically all of the stock of the Spokane International Railway Company, at a cost of about \$2,500,000, the former owners having liquidated all of the floating liabilities, so that the property is free from indebtedness excepting the outstanding bonds.

9. An ocean steamship of 9,400 tons carrying capacity and a speed of 13 knots, now under construction at Newcastle-on-Tyne, has been purchased at a cost of £240,000 for delivery in July or August. This will make the tonnage of your ocean fleet practically the same as it was before the out-

break of war, but to provide for future requirements and to secure the advantage of the earliest construction that circumstances will permit, an arrangement has been made under an agreement with John Brown & Company, Limited, the Fairfield Shipbuilding and Engineering Company, Limited, and Harland & Wolff, Limited, for the building, on a cost and percentage basis, of two steamships 605 ft. in length between perpendiculars with a speed of 20 knots per hour, and two steamships 546 ft. in length between perpendiculars with a speed of 16 knots per hour.

10. Connaught Tunnel, at the summit of the Selkirk Mountains, has been completed, and is now in successful operation. Your Directors are satisfied that increased safety and economy in the operation of that portion of your railway system will more than compensate for the large capital expenditure involved in the work. The estimated value of 15 miles of railway abandoned by reason of the construction of the Tunnel, namely \$1,665,000, has been charged against revenue, thus reducing the capital account by that amount.

11. The yield of the harvest last Autumn and the general business of the country substantially exceeded anticipations, and the result is reflected in your gross and net income during the half year under review.

12. Anticipating your approval, capital expenditure has been authorized in the current year to the amount of \$4,178,775. Of this, additional wharf accommodation and other facilities at Vancouver will absorb \$841,000; shops, stations and other buildings, \$397,000; transfer tracks, crossing sidings and enlargement of yards, \$792,000; craft for coastal service, \$134,000; telegraph lines, \$82,000; and the balance is required for a variety of additions and improvements over the whole System.

13. Your Directors regret to announce the death in December last of their esteemed colleague and friend, Hon. Robert Mackay, who had been a member of the Board since 1903. Hon. Frederick L. Béique, K.C., Senator of Montreal, has been elected a Director to fill the vacancy in the Board caused by the death of Hon. Robert Mackay.

14. The undermentioned Directors will retire from office at the approaching Annual Meeting. They are eligible for re-election.

MR. EDWARD W. BEATTY, K.C.  
HON. FREDERICK L. BÉIQUE, K.C.  
HON. JAMES DUNSMUIR,  
MR. CHARLES R. HOSMER,

For the Directors,

SHAUGHNESSY,  
President and Chairman.

MONTREAL, April 10th, 1917.

CANADIAN PACIFIC RAILWAY COMPANY  
GENERAL BALANCE SHEET, DECEMBER 31st, 1916.

ASSETS.

PROPERTY INVESTMENT:	
Railway	\$354,641,211.23
Rolling Stock Equipment	153,605,367.56
Ocean, Lake and River Steamers	24,735,315.14
	<b>\$532,981,893.93</b>
ACQUIRED SECURITIES (COST):	
Schedule "A"	114,231,203.48
ADVANCES ON LINES AND STEAMSHIPS UNDER CONSTRUCTION	43,416,517.33
ADVANCES AND INVESTMENTS	10,453,138.31
DEFERRED PAYMENTS ON LANDS AND TOWNSITES SALES, NO. 2.	16,889,679.00
SPECIAL INVESTMENT FUND:	
Deferred Payments on Lands and Townsites	\$37,917,833.40
Government and other Securities	11,266,784.50
Deposited with Trustee	7,810,699.88
	<b>56,995,317.78</b>
WORKING ASSETS:	
Material and Supplies on Hand	\$13,597,395.84
Agents' and Conductors' Balances	2,676,544.77
Net Traffic Balances	210,829.04
Miscellaneous Accounts Receivable	8,818,455.99
Temporarily Invested in War Loans	5,979,274.51
Cash in Hand	57,076,018.77
	<b>88,358,518.92</b>
OTHER ASSETS:	
Schedule "B"	123,442,275.15
	<b>\$986,768,543.90</b>

LIABILITIES

CAPITAL STOCK:	
Ordinary Stock	\$260,000,000.00
Four Per Cent. Preference Stock	80,681,921.12
	<b>\$340,681,921.12</b>
FOUR PER CENT. CONSOLIDATED DEBENTURE STOCK	176,284,882.10
MORTGAGE BONDS:	
Algoa Branch 1st Mortgage 5 per cent...	3,650,000.00
NOTE CERTIFICATES 6 PER CENT...	52,000,000.00
PREMIUM ON ORDINARY CAPITAL STOCK SOLD.	45,000,000.00
CURRENT:	
Audited Vouchers	7,259,721.59
Pay Rolls	4,529,490.73
Miscellaneous Accounts Payable	6,199,836.70
	<b>17,989,049.02</b>

ACCURED:	
Rentals of Leased Lines and Coupons on Mortgage Bonds	544,060.51
EQUIPMENT OBLIGATIONS	11,130,000.00
RESERVES AND APPROPRIATIONS:	
Equipment Replacement	5,693,822.98
Steamship Replacement	4,415,457.26
Reserve Fund for Contingencies and for Contingent War Taxes	23,284,640.80
Marine Insurance Fund	555,362.71
	<b>33,949,283.75</b>
NET PROCEEDS LANDS AND TOWNSITES	71,999,871.75
SURPLUS REVENUE FROM OPERATION	116,804,453.96
SURPLUS IN OTHER ASSETS	116,735,021.69
	<b>\$986,768,543.90</b>

I. G. OGDEN,  
Vice-President.

AUDITORS' CERTIFICATE.

We have examined the books and records of the Canadian Pacific Railway Co. for the six months ending December 31st, 1916, and having compared the annexed Balance Sheet and Income Account therewith, we certify that,

in our opinion, the Balance Sheet is properly drawn up so as to show the true financial position of the Company at that date, and that the relative Income Account for the six months is correct.

PRICE, WATERHOUSE & CO.,  
Chartered Accountants (England).

SCHEDULE "C."

DETAILS OF EXPENDITURE ON ADDITIONS AND IMPROVEMENTS FROM JULY 1st, 1916, TO DECEMBER 31st, 1916.

EASTERN LINES:

Additional Sidings, Buildings, Stations and Yards	Cr. \$21,507.14
Permanent Bridges and Improvements of Line	68,113.28
	<b>\$46,606.14</b>
MONTREAL TERMINALS	153,505.60
Drawbridge over Lachine Canal	2,779.65

WESTERN LINES:

Additional Sidings, Buildings, Stations and Yards	\$42,397.57
Permanent Bridges and Improvements of Line	123,998.33
Fort William Terminals, including Coal Plant	17,405.92
Winnipeg Terminals	62,235.39
Calgary Hotel	5,600.86
Vancouver Terminals	144,963.81
Connaught Tunnel	64,205.08
Right of Way	1,563.59
	<b>462,370.55</b>
Additions to Office Buildings and Hotels	406,450.16
Rented and Temporary Sidings	37,429.32
Telegraph Extensions and Additions	15,251.21
	<b>\$1,049,533.99</b>

SCHEDULE "D"

DETAILS OF EXPENDITURE ON LEASED AND ACQUIRED LINES, FROM JULY 1st, 1916, TO DECEMBER 31st, 1916.

NEW BRUNSWICK RAILWAY:

Additional Sidings, Buildings, Stations and Yards	Cr. \$300.75
Permanent Bridges and Improvements of Line	3,856.02
St. John Terminals	133,457.78
	<b>\$137,013.05</b>

ATLANTIC & NORTH WEST RAILWAY:

Additional Sidings, Buildings, Stations and Yards	106,803.67
Permanent Bridges and Improvements of Line	12,469.25

**119,272.92**

MONTREAL & OTTAWA RAILWAY:

Permanent Bridges and Improvements of Line	4,578.37
--------------------------------------------	----------

MONTREAL & WESTERN RAILWAY:

Permanent Bridges and Improvements of Line	410.02
Account Purchase of Road	7,917.00

**8,327.02**

ONTARIO & QUEBEC RAILWAY:

Additional Sidings, Buildings, Stations and Yards	91,549.76
Permanent Bridges and Improvements of Line	27,762.70
Double Tracking	1,314.47
Toronto Terminals	70,229.41

**190,856.34**

MANITOBA & NORTH WESTERN RAILWAY:

Additional Sidings, Buildings, Stations and Yards	13,671.66
Permanent Bridges and Improvements of Line	880.13
Right of Way	540.70

**15,092.49**

MANITOBA SOUTH WESTERN COLONIZATION RAILWAY:

Additional Sidings, Buildings, Stations and Yards	1,367.71
Permanent Bridges and Improvements of Line	12,058.35

**13,426.06**

CALGARY & EDMONTON RAILWAY:

Additional Sidings, Buildings, Stations and Yards	1,659.01
Permanent Bridges and Improvements of Line	2,129.40

**3,788.41**

COLUMBIA & WESTERN RAILWAY:

Additional Sidings, Buildings, Stations and Yards	7,512.40
Permanent Bridges and Improvements of Line	7,517.44
Right of Way	769.38

**15,799.22**

NEW BRUNSWICK SOUTHERN RAILWAY.

JOLIETTE & BRANDON RAILWAY.

OTTAWA, NORTHERN & WESTERN RAILWAY.

ST. MAURICE VALLEY RAILWAY.

GEORGIAN BAY & SEABOARD RAILWAY.

LINDSAY, BOBCAYGEON & PONTYPOOL RAILWAY.

SOUTH ONTARIO PACIFIC RAILWAY.

ALBERTA CENTRAL RAILWAY.

COLUMBIA & KOOTENAY RAILWAY.

KASLO & SLOCAN RAILWAY.

**578.80**

**5,733.02**

**3,125.97**

**652.98**

**1,043.68**

**\$525,014.07**

RECEIPTS AND EXPENDITURES.

SIX MONTHS ENDED DECEMBER 31st, 1916.

Cash in hand, June 30th, 1916.	\$41,581,680.69
Temporarily invested in War Loans.	5,272,690.63

RECEIPTS:

Surplus Revenue as per statement.	\$24,398,143.33
Special Income as per statement.	6,415,352.45

**30,813,495.78**

## LAND DEPARTMENT:

Lands and Townsites:	
Proceeds of Sales and Interest.....	7,203,872.68
Deferred Payments on previous years' sales.....	1,979,829.27
	<b>9,183,701.95</b>
Less amount remaining in Deferred Payments on half-year's sales .....	<b>5,736,817.64</b>
	<b>3,446,884.31</b>
Less: Sales Expenses and Irrigation.....	\$1,795,573.37
Cost of Alberta Ry. & Irr. Co. Land .....	104,230.75
	<b>1,899,804.12</b>
Amount applied in reduction Cost of Mining Properties, Schedule "B" .....	<b>33,333.33</b>
	<b>\$79,248,280.62</b>

## DEDUCT:

Agents' and Conductors' Balances.....	\$2,676,544.77
Net Traffic Balances.....	210,829.04
Miscellaneous Accounts Receivable .....	<b>8,818,455.99</b>
	11,705,829.80
Advances on Lines and Steamships under Construction .....	43,416,517.33
Advances and Investments .....	10,453,138.31
	<b>65,575,485.44</b>
Amount at June 30th, 1916.....	<b>63,561,364.17</b>
	<b>2,014,121.27</b>
	<b>\$77,234,159.35</b>

## EXPENDITURES:

Dividend on Preference Stock: 2 per cent. paid September 30th, 1916.....	\$1,613,638.42
Dividends on Ordinary Stock: 2½ per cent. paid September 30th, 1916.....	6,500,000.00
2½ per cent. paid January 2nd, 1917.....	6,500,000.00
Construction of branch lines.....	13,000,000.00
Additions and Improvements, main line and branches, Schedule "C" .....	60,154.51
Additions and Improvements, leased and acquired lines, Schedule "D" .....	1,049,533.99
Shops and Machinery .....	525,014.07
Ocean, Lake, and River Steamers: Purchase of Steamship "Minota".....	963,600.00
Payments on account of Steamships under construction .....	524,770.86
	<b>1,488,370.86</b>
Less amount paid from Steamship Replacement .....	<b>964,769.05</b>
	<b>523,601.81</b>
Amount deposited and Securities purchased for Special Investment Fund .....	<b>3,413,098.96</b>

## SECURITIES ACQUIRED:

Consolidated Mining & Smelting Co. Stock..	826,625.00
Spokane International Ry. Stock.....	2,437,488.95

Payment of Equipment Obligations .....	3,264,113.95
Increase in Material and Supplies on hand.....	<b>550,000.00</b>
	<b>1,782,812.00</b>

## DEDUCT INCREASE IN LIABILITIES:

Current Liabilities .....	17,989,049.02
Interest on Funded Debt .....	544,060.51
Reserves and Appropriations.....	33,949,283.75
	<b>52,482,393.28</b>
Amount at June 30th, 1916.....	<b>40,844,680.74</b>
	<b>11,637,712.54</b>

Temporarily invested in War Loans .....	14,178,866.07
Cash in hand .....	5,979,274.51
	<b>57,076,018.77</b>

	<b>\$77,234,159.35</b>
<b>STATEMENT OF EARNINGS FOR THE SIX MONTHS ENDED DECEMBER 31st, 1916.</b>	
<b>From Passengers .....</b>	
" Freight .....	\$15,988,424.21
" Mails .....	51,945,291.60
" Sleeping Cars, Express, Telegraph and Miscellaneous..	753,388.35
Total .....	8,030,861.20
	<b>\$76,717,965.36</b>

<b>STATEMENT OF WORKING EXPENSES FOR THE SIX MONTHS ENDED DECEMBER 31st, 1916.</b>	
Transportation Expenses .....	\$21,943,020.86
Maintenance of Way and Structures.....	8,245,741.01
Maintenance of Equipment .....	9,840,615.95
Traffic Expenses .....	1,540,813.97
Parlor and Sleeping Car Expenses.....	530,118.23
Expenses of Lake and River Steamers.....	570,848.39
General Expenses .....	2,318,687.20
Commercial Telegraph .....	853,353.89
Total .....	<b>\$45,843,199.50</b>

## TRAIN TRAFFIC STATISTICS—FOR SIX MONTHS ENDED DECEMBER 31st, 1916 AND 1915.

EARNINGS OF LAKE AND RIVER STEAMERS NOT INCLUDED IN THIS STATEMENT.

	Six months ended Dec. 31st, 1916.	Six months ended Dec. 31st, 1915.	Increase or Decrease.
TRAIN MILEAGE.			
Passenger trains .....	9,970,231	9,461,213	509,018 5.38
Freight " .....	13,315,730	12,508,427	807,303 6.45
Mixed " .....	1,061,148	1,054,477	6,671 .63
Total trains .....	24,347,109	23,024,117	1,322,992 5.75

## CAR MILEAGE.

PASSENGER.				
Coaches and P. D. and S. cars .....	52,199,416	47,993,721	4,205,695 8.76	
Combination cars .....	1,355,824	1,351,348	4,476 .33	
Baggage, Mail and Express cars .....	21,838,142	20,358,390	1,479,752 7.27	
Total Passenger cars..	75,393,382	69,703,459	5,689,923 8.16	
FREIGHT.				
Loaded .....	339,011,940	300,634,214	38,377,726 12.77	
Empty .....	142,364,632	142,527,629	162,997 .11	
Caboose .....	14,900,399	13,658,448	1,241,951 9.09	
Total Freight cars....	496,276,971	456,820,291	39,456,680 8.64	
Passenger cars per Traffic Train Mile .....	6.81	6.63	.18 2.71	
Freight cars per Traffic Train Mile .....	34.52	33.68	.84 2.49	

## PASSENGER TRAFFIC.

Passengers carried (earning revenue) .....	8,866,479	7,377,861	1,488,618 20.17
Passengers carried (earning revenue) one mile .....	842,738,613	733,037,475	109,701,138 14.96
Passengers carried (earning revenue) one mile per mile of road.....	64,858	56,748	8,110 14.29
Average journey per passenger .....	95.05	99.36	4.31 4.34
Average amount received per passenger .....	1.78	1.85	.07 3.78
Average amount received per passenger mile...cts.	1.87	1.86	.01 .54
Average number of passengers per train mile....	76.39	69.71	6.68 9.58
Average number of passengers per car mile.....	15.74	14.86	.88 5.92
Revenue from passengers per passenger car mile...cts.	29.46	27.66	1.80 6.51
Total passenger train earnings per train mile....\$	1.81	1.65	.16 9.70
Total passenger train earnings per mile of road....\$	1,535.02	1,344.49	190.53 14.17

## FREIGHT TRAFFIC.

Tons of revenue freight carried one mile.....	7,702,459,708	6,841,938,564	860,521,144 12.58
Tons of non-rev. freight carried one mile .....	826,250,797	616,400,971	209,849,826 34.04
Total tons (all classes) freight carried one mile.....	8,528,710,505	7,458,339,535	1,070,370,970 14.35
Tons of revenue freight carried one mile per mile of road .....	592,789	529,668	63,121 11.91
Tons of non-rev. freight carried one mile per mile of road .....	63,589	47,719	15,870 33.26
Total tons (all classes) freight carried one mile per mile of road .....	656,378	577,387	78,991 13.68
Average amount received per ton per mile of revenue freight ...cts.	0.663	0.650	0.013 2.00
Average No. of tons of revenue freight per train mile .....	535.75	504.46	31.29 6.20
Average No. of tons of non-rev. freight per train mile .....	57.46	45.45	12.01 26.43
Average No. of tons of (all classes) freight per train mile .....	593.21	549.91	43.30 7.87
Average No. of tons of revenue freight per loaded car mile .....	22.72	22.76	.04 .18
Average No. of tons of non-rev. freight per loaded car mile .....	2.44	2.05	.39 19.02
Average No. of tons of (all classes) freight per loaded car mile .....	25.16	24.81	.35 1.41
Freight train earnings per loaded car mile....cts.	15.07	14.80	.27 1.87
Freight train earnings per train mile .....	3.55	3.28	.27 8.23
Freight train earnings per mile of road .....	3,931.67	3,444.14	487.53 14.15